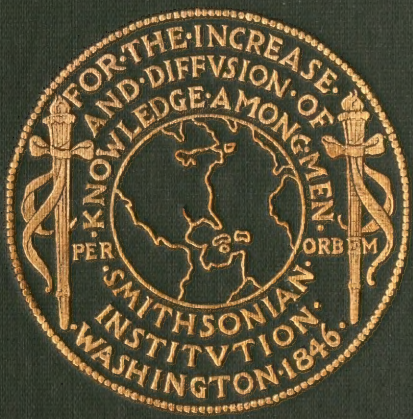
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AND·DIFFVSION·OF
KNOWLEDGE·AMONG·MEN·
PER
ORBEM
·SMITHSONIAN·
INSTITVTION·
·WASHINGTON·1846·

ANNUAL REPORT

OF THE

BOARD OF REGENTS

OF THE

SMITHSONIAN INSTITUTION,

SHOWING

THE OPERATIONS, EXPENDITURES, AND CONDITION
OF THE INSTITUTION

FOR THE

YEAR ENDING JUNE 30, 1903.

REPORT

OF THE

U. S. NATIONAL MUSEUM.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1905.

AN ACT PROVIDING FOR THE PUBLIC PRINTING AND BINDING, AND THE DISTRIBUTION OF PUBLIC DOCUMENTS.

Approved January 12, 1895.

"Of the Report of the Smithsonian Institution, ten thousand copies; one thousand copies for the Senate, two thousand for the House, five thousand for distribution by the Smithsonian Institution, and two thousand for distribution by the National Museum."

REPORT

OF THE

U. S. NATIONAL MUSEUM,

UNDER THE DIRECTION OF

THE SMITHSONIAN INSTITUTION,

FOR

THE YEAR ENDING JUNE 30, 1903.

REPORT OF THE U. S. NATIONAL MUSEUM FOR THE YEAR ENDING JUNE 30, 1903.

SUBJECTS.

I. Report of the Assistant Secretary of the Smithsonian Institution, with Appendices.

II. Papers descriptive of Museum Buildings.

United States National Museum,
Under direction of the Smithsonian Institution,
Washington, October 1, 1903.

Sir: I have the honor to submit herewith a report upon the present condition of the United States National Museum, and upon the work accomplished in its various departments during the fiscal year ending June 30, 1903.

Very respectfully,

Richard Rathbun,
Assistant Secretary, in charge of the U. S. National Museum.

Mr. S. P. Langley,
Secretary, Smithsonian Institution.

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PART I.

REPORT UPON THE CONDITION AND PROGRESS OF THE U. S. NATIONAL MUSEUM DURING THE YEAR ENDING JUNE 30, 1903.

BY

RICHARD RATHBUN,

ASSISTANT SECRETARY OF THE SMITHSONIAN INSTITUTION,
IN CHARGE OF THE U. S. NATIONAL MUSEUM.

REPORT

UPON

THE CONDITION AND PROGRESS OF THE U. S. NATIONAL MUSEUM DURING THE YEAR ENDING JUNE 30, 1903.

BY

RICHARD RATHBUN,

Assistant Secretary of the Smithsonian Institution, in charge of the U. S. National Museum.

GENERAL CONSIDERATIONS.

The United States National Museum had its origin in the act of Congress of 1846 founding the Smithsonian Institution, which made the formation of a museum one of the principal functions of the latter, and provided that—

> Whenever suitable arrangements can be made from time to time for their reception, all objects of art and of foreign and curious research, and all objects of natural history, plants, and geological and mineralogical specimens belonging to the United States, which may be in the city of Washington, in whosesoever custody they may be, shall be delivered to such persons as may be authorized by the Board of Regents to receive them, and shall be so arranged and classified in the building erected for the Institution as best to facilitate the examination and study of them; and whenever new specimens in natural history, geology, or mineralogy are obtained for the museum of the Institution, by exchanges of duplicate specimens, which the Regents may in their discretion make, or by donation, which they may receive, or otherwise, the Regents shall cause such new specimens to be appropriately classed and arranged.

The principal and accumulated interest of the Smithsonian fund amounted at that time to about $750,000, a sum considered ample to meet the needs of the various operations in which it was proposed that the Smithsonian Institution should engage. In 1846 probably not more than one or two universities or learned establishments in America had so large an endowment, and it was apparently the idea of Congress that the fund was sufficient both for the erection of a building and for the care of the collections which would be turned over to it or acquired by the national surveys, and in other ways. The Museum thus began as an integral part of the Institution, coordinate with its library, and was required by law to provide for the Government collections which had previously accumulated, a duty which the

Institution did not see its way clear to fulfill until 1858, when Congress began to make small yearly appropriations to aid in this purpose. So inadequate, however, were the sums voted that for many years the slender income of the Institution continued to be drawn upon to insure the maintenance of what was then justly called the Smithsonian Museum, since the building was paid for out of the Smithson fund, a considerable portion of the collections was and still is the property of the Institution, through exploration and gift, and a number of the officials connected with the Museum were employed at its expense.

The first scientific collection to come into the possession of the Institution—and, in fact, it accompanied the bequest—was the small but valuable mineralogical cabinet of James Smithson, the founder, who was himself a chemist and mineralogist of repute and a Fellow of the Royal Society of London.

The nucleus of the National Museum was, however, virtually acquired by the National Institute, a society organized in Washington about 1840, having for its avowed purpose the direction of the Smithson bequest and the pursuit of objects in consonance with the terms of that foundation. One of these objects was the gathering of historical and natural history specimens from both official and private sources, most prominent among the former having been the United States Exploring Expedition around the world from 1838 to 1842. Rooms in the Patent Office building were secured for the museum of the society, which was practically recognized as the appropriate place of deposit for all Government collections retained in Washington. Another important service rendered by the society was, as the late Dr. G. Brown Goode has said, in the direction of educating public opinion "to consider the establishment of such an institution worthy of the Government of the United States." Failing, however, to secure the public recognition at which it aimed, it became inactive upon the establishment of the Smithsonian Institution in 1846, and its charter, which expired in 1861, was not renewed. The Government collections in its possession, which came practically under the care of the Commissioner of Patents, were turned over to the Smithsonian Institution in 1858. Other material directly under the control of the National Institute remained at the Patent Office until 1862, and a part of the historical objects were held there until 1883.

Previous to 1858, however, important materials for a museum were being accumulated at the Smithsonian Institution, at its own cost and through the activities of its assistant secretary, Prof. Spencer F. Baird, beginning even before his appointment to that office in 1850. The personal bent of Professor Baird was toward the collection of natural history specimens for purposes of study. With the approval of Secretary Henry he put into operation plans for the accomplishment of this object, which, fostered and encouraged, were soon yield-

ing regular and abundant returns. Professor Baird's own vacations were spent in field work. Officers of the Army and Navy and of other branches of the Government service, fishermen, fur traders, private explorers, and such powerful organizations as the Hudson's Bay Company and the Western Union Telegraph Company, were enlisted in the work and rendered valuable assistance. The influence exerted by these beginnings has been lasting and widespread, as shown in the extensive natural history operations of subsequent National and State surveys, the organization of the Fish Commission and Bureau of Ethnology, and the support given to scientific collecting by many other bureaus of the Government.

The discussion of plans for the organization of the Smithsonian Institution, which devolved upon the first Board of Regents, led, in January, 1847, to the unanimous adoption of the following resolution expressing approval of the museum feature as one of its important functions:

Resolved, That it is the intention of the act of Congress establishing the Institution, and in accordance with the design of Mr. Smithson, as expressed in his will, that one of the principal modes of executing the act and the trust is the accumulation of collections of specimens and objects of natural history and of elegant art, and the gradual formation of a library of valuable works pertaining to all departments of human knowledge, to the end that a copious storehouse of materials of science, literature, and art may be provided, which shall excite and diffuse the love of learning among men, and shall assist the original investigations and efforts of those who may devote themselves to the pursuit of any branch of knowledge.[a]

The policy thus announced has prevailed to the present day.

In 1879, when most of the existing Government surveys, whose work included the collecting of specimens in the field, had been established, Congress deemed it important to practically reenforce the provisions of the act founding the Institution, in order that there might be no doubt as to the proper disposition of the material certain to be derived from these various sources, by the following enactment in the sundry civil appropriation act for 1880:

All collections of rocks, minerals, soils, fossils, and objects of natural history, archeology, and ethnology, made by the Coast and Interior Survey, the Geological Survey, or by any other parties for the Government of the United States, when no longer needed for investigations in progress shall be deposited in the National Museum.

Although the name "National Museum" was sometimes used in the earlier reports of the Smithsonian Institution, it did not appear in any of the laws of Congress until 1875. Its general employment may be said to date from the time of the Philadelphia Centennial Exhibition of 1876, the first exposition in this country in which the Government participated, and the first to make known to vast numbers of the people of the United States the existence of national collections at

[a] Report of Committee on Organization, p. 20.

Washington, as well as new methods of installing and exhibiting museum materials, differing radically from the older cabinets of college or local museums, which had prevailed up to that period. After its close the Government exhibits brought back to Washington, together with the extensive gifts made to the United States by private persons and foreign governments, rendered necessary the early erection of a new and separate building, devoted entirely to museum purposes. Since that time Congress has mainly provided for the maintenance of the Museum, but its management remains, by the fundamental act, under the authority of the Regents of the Smithsonian Institution, administered through their Secretary, who is *ex officio* the keeper—a form of government insuring a consistent and uniform policy and a nonpartisan administration of its affairs. The greater part of the Smithsonian building is still used for museum purposes, and the Institution, as well as most of the scientific bureaus at Washington, cooperate, both through men and material, in enlarging and caring for the national collections.

The scope of the National Museum as defined by law comprises practically all branches of science and of the arts which admit of museum treatment. With exceedingly limited means for making purchases, and therefore almost entirely dependent as to the character of its collections upon Government explorations, personal donations, and exchanges, its different departments have had a very unequal growth. The subjects best represented are American ethnology and archeology, geology, zoology, and botany. A fair beginning has been made in the exceedingly important branches of the industrial arts and American history, and scarcely more is required to place these two departments on a proper basis than sufficient room to display the necessary collections, which are certain to be received, in greater part through gratuitous contributions, when it is known that the Museum is prepared to care for them. In the department of the fine arts the collection is still very small, but the subject is one which must sooner or later receive earnest consideration by the Government.

The specimens in all branches are classified in two series; one, comprising the bulk of the material, being arranged for the purposes of scientific research and reference in laboratories and storerooms, to which students are freely admitted; the other, selected with regard to their general educational value and public interest, and accompanied by descriptive labels, being displayed in glass-covered cases in the public halls. The duplicate specimens not required for exchanges are made up into sets for distribution to schools and colleges, as opportunity offers. Papers descriptive of the collections, both technical and popular, are published for gratuitous circulation to the extent of three or more volumes yearly, and, finally, the Museum has come to be regarded as a bureau of information in respect to all

subjects with which it is even in the remotest degree concerned, the correspondence which this involves now constituting one of its heaviest tasks.

The history of the Museum, as pointed out by the late Dr. Goode, may be divided into three epochs, which he characterized as follows:

First, the period from the foundation of the Smithsonian Institution to 1857, during which time specimens were collected solely to serve as materials for research. No special effort was made to exhibit them to the public or to utilize them, except as a foundation for scientific description and theory.

Second, the period from 1857, when the Institution assumed the custody of the "National Cabinet of Curiosities," to 1876. During this period the Museum became a place of deposit for scientific collections which had already been studied, these collections, so far as convenient, being exhibited to the public and, so far as practicable, made to serve an educational purpose.

Third, the present period (beginning in the year 1876), in which the Museum has undertaken more fully the additional task of gathering collections and exhibiting them on account of their value from an educational standpoint.

During the first period the main object of the Museum was scientific research; in the second, the establishment became a museum of record as well as of research, while in the third period has been added the idea of public education. The three ideas—record, research, and education—cooperative and mutually helpful as they are, are essential to the development of every great museum. The National Museum endeavors to promote them all.

In the same connection, Dr. Goode also defined the scope and objects of the Museum in the following concise manner:

It is a museum of record, in which are preserved the material foundations of an enormous amount of scientific knowledge—the types of numerous past investigations. This is especially the case with those materials that have served as a foundation for the reports upon the resources of the United States.

It is a museum of research, which aims to make its contents serve in the highest degree as a stimulus to inquiry and a foundation for scientific investigation. Research is necessary in order to identify and group the objects in the most philosophical and instructive relations, and its officers are therefore selected for their ability as investigators, as well as for their trustworthiness as custodians.

It is an educational museum, through its policy of illustrating by specimens every kind of natural object and every manifestation of human thought and activity, of displaying descriptive labels adapted to the popular mind, and of distributing its publications and its named series of duplicates.

AS A MUSEUM OF RECORD.

In its function as a museum of record the growth of the National Museum has been unprecedented, due mainly to the rapid exploration and development of a rich and extensive country under the liberal and progressive policy of the Government. From scientific institutions throughout the world, from foreign governments, and from individuals abundant stores of great value have been received, either as gifts or through the medium of exchange of specimens, and a small appropriation in recent years has permitted of some purchases to supply desiderata.

The principal sources of the collections may be briefly summarized as follows:

1. The explorations carried on more or less directly under the auspices of the Smithsonian Institution, or by the Institution in connection with educational institutions or commercial establishments, and the efforts, since 1850, of its officers and correspondents toward the accumulation of natural history and anthropological material.

2. The United States Exploring Expedition around the world from 1838 to 1842, the North Pacific, or Perry, Exploring Expedition from 1853 to 1856, and many subsequent naval expeditions down to and including the recent operations in the West Indian and Philippine waters.

3. The activities of members of the United States diplomatic and consular service abroad.

4. The Government surveys at home, such as the Pacific Railroad surveys, the Mexican and Canadian boundary surveys, and the surveys carried on by the Engineer Corps of the U. S. Army; and the activities of officers of the Signal Corps, and other branches of the Army stationed in remote regions.

5. The explorations of the U. S. Geological Survey, the U. S. Fish Commission, the Department of Agriculture, the Bureau of American Ethnology of the Smithsonian Institution, and other scientific branches of the Government.

6. Donations and purchases in connection with the several expositions at home and abroad in which the Museum and Fish Commission have participated, among these having been the Centennial Exhibition at Philadelphia in 1876, the International Fisheries Exhibitions at Berlin in 1880 and at London in 1883, the New Orleans Cotton Centennial Exposition in 1884 and 1885, the Cincinnati Exposition of 1888, the World's Columbian Exposition at Chicago in 1893, and the expositions at Atlanta in 1895, at Nashville in 1897, at Omaha in 1898, and at the Pan-American Exposition of 1901. The returns from the World's Fair in Philadelphia were of greatest extent, comprising, besides the collections displayed by the United States in illustration of the animal and mineral resources, the fisheries, and the ethnology of the native races of the country, valuable gifts from thirty of the foreign governments which participated, as well as the industrial collections of numerous manufacturing and commercial houses of Europe and America.

7. Exchanges with foreign and domestic museums and with individuals.

Immediately preceding the Centennial Exhibition of 1876, when the collections were entirely provided for in the Smithsonian building, the number of entries of specimens in the Museum record books was about 235,000. In 1884, when the additional room afforded by the new building gave opportunity for taking a provisional census of the large

accessions received from Philadelphia and from other sources, the number had grown to 1,471,000. At the close of the year covered by this report the total number of recorded specimens was 5,654,864.

While these figures convey no impression of the bulk of the collections, when it is considered that by 1885 all of the space in both buildings was completely filled, and in fact so overcrowded that a third building was already being asked of Congress, some conception may be had of the conditions now existing. The storerooms are packed to their utmost capacity, making it difficult to gain access to the specimens or to provide adequately for their safety. For many years most of the objects received have had to be stored in outside and unsafe structures, where they are mainly piled up in the original packing boxes, and where has already accumulated enough material of great intrinsic and scientific value to fill an additional building as large as that now occupied by the main collections.

AS A MUSEUM OF RESEARCH.

In order to permit of their examination and study, as provided in the act of establishment, the collections of the Museum are, to the extent of its accommodations, arranged systematically and in a manner convenient for reference. Access to the reserve or study series, so called, consisting of the main body of the collections and as complete in all the groups as the accessions have made possible, is given to all properly qualified persons engaged in original research. The opportunities thus afforded are widely availed of, the Museum being visited every year by many investigators, some of world-wide distinction, coming from the scientific centers of European and other foreign countries, as well as from all parts of the United States. Material is also occasionally sent out to representatives of other institutions having the means of providing for its safe-keeping, when required in the working up of special subjects, or for comparison in connection with their own collections.

The custodianship of the collections being the first and most imperative duty devolving upon the scientific staff of the National Museum, its members find comparatively little time during office hours for advancing knowledge, though they are mostly well qualified for such work, being selected with special reference to their ability to identify and classify the specimens under their charge in accordance with the latest researches. As a matter of fact, however, the staff does produce every year a large number of papers descriptive of the collections, which together constitute an important contribution to scientific literature.

Among the honorary officers having their laboratories at the Museum are a number of assistants employed by other scientific bureaus to conduct investigations on material kept here in their charge, and in whose results the Museum shares.

Many collections have, from time to time, been transferred by the Geological Survey, the Fish Commission, the Department of Agriculture, and other branches of the Government to the custody of the Museum in advance of their final working up, in order to provide for their safe storage and to secure the better facilities for study here afforded. Under this arrangement the amount of research work carried on in the Museum building has been greatly increased.

Though having little means to expend for field work, members of the Museum staff are occasionally given opportunities to participate in the explorations of other Government bureaus or of private expeditions, in connection with which special researches may be carried on, though the chief advantage results from the acquisition of new and valuable material and a knowledge of the conditions under which it occurred in nature.

AS AN EDUCATIONAL MUSEUM.

The educational side of the Museum is intended to consist mainly of an exhibition of all the classes of objects which it represents, so mounted, installed, and labeled as to directly interest and instruct the general public. The principal difficulty incident to the proper installation of such a collection, conceding all the space required, lies in the selection of its parts, so that while enough is displayed to convey the amount of information which it is intended to impart, the visitor shall not be overburdened or confused with details. While this policy is being followed in the National Museum so far as its means permit, the lack of room has always prevented a complete or satisfactory development of the plan, and every succeeding year the conditions in this respect grow worse instead of better through the increased crowding of the halls. The advances in recent years have been chiefly in the methods of display, in the character of individual and group mountings, and in the labeling, in all of which directions exceptional progress has been made.

Two years ago it was announced that all of the halls designed for public use were then for the first time permanently open, though none were above addition or improvement, while in some the arrangement was entirely provisional. This was only accomplished by the transfer of large quantities of material to outside storage, but during the past year it has unfortunately been again necessary to shut off one of the most attractive halls in order to furnish increased space for workrooms.

In this connection it seems appropriate to refer to the work of Doctor Goode, than whom no museum administrator ever had a better understanding of the public needs. He labored earnestly and conscientiously to make this a museum for as well as of the people, and the plans now being carried out are, in all their essential features, of his making. While the assistants might be relied upon to arrange and

maintain the study series in a manner acceptable to the specialist, the interests of the public always remained in his immediate charge. He was ever occupied in devising ways for so presenting the features of nature and the activities of mankind that by the very force of his surroundings the visitor was bound to receive and carry with him some definite impressions, some new bit of knowledge. Doctor Goode's labors in this field ranged from the planning of the general scheme to the most minute details of case architecture and fittings. His official connection with nearly all the important expositions of the past quarter of a century and his exhaustive studies of all the principal museums of Europe and the United States gave him exceptional opportunities for observation and experiment. Though a young man when he died, none other had acquired so ripe an experience and none is more worthy of being followed.

An incidental though very popular educational feature of the Museum, having for its purpose the promotion of scientific teaching throughout the country, has been the distribution to schools and colleges of its duplicate specimens, properly identified and labeled, and put up in carefully selected sets. Inadequate means have prevented this measure from being carried out on the scale which the resources of the Museum would admit of, but many hundreds of such sets have already been given away.

Scarcely a year passes that some exposition, either at home or abroad, is not occupying the attention of the Museum, and through this means its existence and aims are brought constantly and prominently before the public. These expositions have of late followed one another so closely and have required such extensive preparations as to interfere greatly with the ordinary work of the Museum, but the practice of introducing new and varied features, of showing a fresh series of objects or improved groupings in connection with each one, insures a substantial gain, as the collections are returned to Washington, besides fulfilling the important function of making museum methods known to the people of the United States and stimulating the growth of museums in many quarters.

Though mainly technical and most useful to the investigator, the publications of the Museum can be classed, in a general way, as belonging to its educational side, being the medium through which the nature and extent of its collections are made known. The Annual Report, first printed as a separate volume of the Smithsonian Report in 1884, and now in its twentieth volume, consists, besides the administrative part, mainly of semipopular papers on interesting portions of the collections. The Proceedings and Bulletins are almost exclusively technical, the shorter papers being assigned to the former and the larger and more exhaustive works to the latter. Of the Proceedings twenty-four complete volumes have been issued, and of the Bulletins fifty-two numbers.

AN ADDITIONAL MUSEUM BUILDING.

For over two decades a few paragraphs in this report have been annually devoted to an account of the crowded and unsafe condition of the national collections, and the consequent impossibility of further complying with the law for their proper classification, arrangement, and care. Fortunately these conditions are soon to be remedied through the erection of an additional building, having a capacity far exceeding that of the existing structures combined, with exhibition halls to the extent of nearly 5 acres, and facilities for all kinds of museum work.

In the last report it was announced that Congress had authorized the preparation of plans for this new building, which was to be constructed of brick and terra cotta at a limit of cost of $1,500,000, and to occupy a site on the north side of the Mall opposite the Smithsonian Institution. Such a building, though large enough to relieve the immediate demands for additional space, would provide very inadequately for the growth of the collections, and the material named for the fronts was not considered entirely suitable for a structure of the character proposed. Nearly a year was occupied in examining into the requirements of the collections and in studying the principal features of other museums. During the winter of 1902–3, a series of tentative plans was prepared, and accompanied by a supplementary report by the Secretary of the Smithsonian Institution was submitted to a special committee consisting of the Congressional Regents, "to represent to Congress the pressing needs of additional room for the proper exhibition of specimens belonging to the National Museum." On January 23, 1903, the same papers were transmitted to Congress and printed as Document 314 of the House of Representatives.

The plans provided for a large rectangular building, four stories high including the basement, which was to be in all essential features the equivalent of a story, well lighted and entirely serviceable for museum purposes. The cost of the whole building, constructed of brick and terra cotta, was estimated at $3,000,000, but one-half of the structure, in symmetrical form, could be built for $1,500,000, thus meeting the requirements of the act of 1902. The special committee of the Regents above mentioned adopted the report of the Secretary, though urging the larger building, in the following resolution:

> That under the limitations of the law the committee hereby report to Congress Plan B for a new National Museum building as the best obtainable for the amount mentioned; but, in the judgment of the committee, the larger plan, A, is believed to be the one which should be adopted, and we therefore ask that Congress shall make the appropriation for it instead of for the smaller plan.

Hearings followed before the Committees on Appropriations of both the House and Senate, and a plea was made for the use of granite instead of brick and terra cotta. The House took no action, but a bill

for the erection of the entire building in granite, at a limiting cost of $3,500,000, was adopted by the Senate, and the measure in this shape was finally agreed to in conference between the committees of the two Houses. The bill as passed, being an item in the sundry civil act for 1904, was as fellows:

Building for National Museum: To enable the Regents of the Smithsonian Institution to commence the erection of a suitable fireproof building with granite fronts, for the use of the National Museum, to be erected on the north side of the Mall, between Ninth and Twelfth streets, northwest, substantially in accordance with the Plan A, prepared and submitted to Congress by the Secretary of the Smithsonian Institution under the provisions of the act approved June twenty-eighth, nineteen hundred and two, two hundred and fifty thousand dollars. Said building complete, including heating and ventilating apparatus and elevators, shall cost not to exceed three million five hundred thousand dollars, and a contract or contracts for its completion is hereby authorized to be entered into subject to appropriations to be made by Congress. The construction shall be in charge of Bernard R. Green, Superintendent of Buildings and Grounds, Library of Congress, who shall make the contracts herein authorized and disburse all appropriations made for the work, and shall receive as full compensation for his services hereunder the sum of two thousand dollars annually in addition to his present salary, to be paid out of said appropriations.

At a meeting of the Board of Regents held on March 12, 1903, a committee to represent the Board in connection with the work of construction was designated by resolution as follows:

That the Secretary, with the advice and consent of the Chancellor and the chairman of the executive committee, be authorized to represent the Board of Regents so far as may be necessary in consultation with Bernard R. Green, to whom the construction and contracts for the new Museum building are committed by Congress in the act making an appropriation for that purpose.

Messrs. Hornblower & Marshall, of Washington, who made the tentative plans, were selected as architects and before the close of the fiscal year their part of the work was well under way. It is expected that about four or five years will be required for the construction of the building.

SUMMARY OF THE OPERATIONS OF THE YEAR.

APPROPRIATIONS AND EXPENDITURES.

The Congressional appropriations for the maintenance of the National Museum during the fiscal year ending June 30, 1903, amounted to $281,400, a decrease of $8,000 as compared with the previous year, the changes being as follows: The bill for 1902 contained three specific appropriations, one of $5,000 for the construction of two galleries, one of $5,000 for electrical installation, and one of $12,500 for new boilers, while the appropriations for 1903 comprised a new item of $7,000 for preparing and printing the Contributions from the U. S. National Herbarium, heretofore published by the Department of Agriculture, $5,000 for the preparation of plans for an additional Museum building, and an increase of $2,500 in the appropriation for furniture and fixtures.

The following tables show the expenditures during the year 1902–3 under each item of the appropriations for the past two years:

Appropriations and expenditures for the fiscal year ending June 30, 1903.

Object.	Appropriations.	Expenditures.	Balance June 30, 1902.
Preservation of collections	$180,000	$170,402.80	$9,597.20
Furniture and fixtures	22,500	20,803.76	1,696.24
Heating, lighting, and electrical service	18,000	16,037.37	1,962.63
Repairs to buildings, shops, and sheds	15,000	13,471.03	1,528.97
Books, pamphlets, and periodicals	2,000	1,393.38	606.62
Purchase of specimens	10,000	5,999.31	4,000.69
Rent of workshops, etc	4,400	4,399.92	.08
Postage	500	500.00	.....
Publishing Contributions, National Herbarium	7,000	3,027.49	3,972.51
Plans for additional building, National Museum	5,000	4,956.80	43.20
Printing and binding	17,000	16,994.41	5.59
Total	281,400	257,986.27	23,413.73

Disbursements from unexpended balances of appropriations for the fiscal year ending June 30, 1902.

Object.	Balance June 30, 1902.	Expenditures.	Balance June 30, 1903.
Preservation of collections	$5,709.78	$5,550.62	$159.16
Furniture and fixtures	2,136.15	2,131.08	5.07
Heating and lighting, etc	1,560.43	1,558.83	1.60
Building repairs, etc	1,938.30	1,911.07	27.23
Galleries	37.92	36.75	1.17
Books, pamphlets, and periodicals	1,142.97	944.70	198.27
Purchase of specimens	2,471.30	2,416.04	55.26
Rent of workshops, etc	.08		.08
Total	14,996.93	14,549.09	447.84

Disbursements from the appropriations for 1900–1901 were made as follows: Preservation of collections, $49.61; books, pamphlets, and periodicals, $86.74, leaving balances of $24.88 and $5.40 respectively. These balances, together with the unexpended balances of the appropriations for furniture and fixtures, heating and lighting, building repairs, purchase of specimens, and rent of workshops, amounting to $74.41, have reverted to the surplus fund of the Treasury.

Appropriations for the year ending June 30, 1904.

Preservation of collections	$180,000
Furniture and fixtures	22,500
Heating, lighting, and electrical service	18,000
Purchase of specimens	10,000
Books, pamphlets, and periodicals	2,000
Repairs to buildings, shops, and sheds	15,000
Rent of workshops and temporary storage quarters	4,400
Postage	500
Additional building for National Museum	250,000
Printing labels, blanks, and Bulletins and Proceedings, and for binding books for the Library	17,000
Total	519,400

BUILDINGS.

At its last session, ending March 4, 1903, Congress authorized, in the sundry civil act for 1903–4, the construction of an additional fireproof building of granite for the National Museum, at a cost not to exceed $3,500,000, and appropriated $250,000 for the requirements of the first year. The preparation of the final plans was begun near the close of the fiscal year, and the work will be pushed as rapidly as possible.

The roofs on the several sections of the Museum building have continued to give trouble, as new leaks develop during every heavy rain and snow storm. This is more especially the case with the slate coverings over the main halls, but the tin roofs are also in bad condition

and both demand constant attention and repair, at some expense. Before many years a new roof will become absolutely necessary, but in the meantime it is proposed, should the regular appropriations suffice for the purpose, to gradually replace the slate coverings with better material, as only in this manner can the more pressing difficulties be even temporarily overcome.

The leaks which have occurred through many years, and the frequent repairs to walls and ceilings, had so defaced the interior of the greater part of the Museum building as to render it unsightly in the extreme. At the beginning of the fiscal year it was decided to remedy these conditions so far as possible by painting those parts of the building which required it, in accordance with a simple but artistic scheme of color. The rotunda and main halls were first completed, and next three of the courts, leaving only one of the latter to be done during the current year. The ranges do not call for any changes in this respect at present. With this improvement the building has now been placed in a far more presentable condition than ever before.

Another improvement in the Museum building has been the arrangement of inner screen doors at the eastern or freight entrance, so as to close off from the public or exhibition halls the vestibule in which packages are received. Some of the rooms over this same entrance, used by the Division of Plants, have also been modified and enlarged.

The archeological hall in the Smithsonian building has been closed to the public during nearly the entire year. In September, 1902, so many large pieces of plaster fell from the ceiling that its condition was declared unsafe, and though all of the loose plaster was subsequently removed, yet the appearance of the hall does not justify its reopening at present. It is expected, however, to make such temporary repairs before the close of another year as will permit of its being again made accessible.

ADDITIONS TO THE COLLECTIONS.

The number of accessions or separate lots of material received during the year was 1,643, being 234 more than in 1902. They comprised about 236,580 specimens of all kinds, bringing the total number of specimens in the several departments of the Museum up to about 5,654,864. There were also received for identification 886 lots of specimens, the most of which were returned to the senders with the information requested.

The most constant and important sources of material are the national surveys and explorations, whose collections are, by law, transferred to the custody of the Museum as soon as the necessary studies upon them have been completed. The bureaus which figure most prominently in this work are the Geological Survey, the Fish Commission, the Biological Survey, and the Divisions of Insects and Plants of the

Department of Agriculture, and the Bureau of American Ethnology of the Smithsonian Institution, though valuable contributions are occasionally obtained from other branches of the Government service, and officers of the Army and Navy stationed in the new possessions have, in their individual capacity, been rendering much assistance. A very large share of the additions to the collections is, however, received from private individuals and establishments through donation and exchange, and the exhibition series derives many of its attractive features from loans or deposits. Field collecting by members of the Museum staff is almost prohibited by the lack of funds, and the acquisition of specimens by purchase is seriously restricted because of the small amount appropriated for that purpose.

A complete list of the accessions for the year is given in Appendix II, and the important ones are described in the reports of the head curators. Only some of the more noteworthy ones will, therefore, be referred to in this connection.

The total number of specimens added in the Department of Anthropology was 24,319, of which 16,181 specimens belonged in the Division of Prehistoric Archeology, 4,547 in Ethnology, and 1,502 each in History and the Graphic Arts. One of the most valuable acquisitions consisted of material recently collected by Dr. W. L. Abbott in Sumatra and the Straits Settlements, and illustrated the native arts and industries of a region but poorly represented in American museums. The many objects, numbering over 1,500, secured in the Philippine Islands by the late Col. F. F. Hilder, of the Bureau of American Ethnology, for the Government exhibit at the Pan-American Exposition, have been turned over to the Museum by the Government Board. This collection is of especial interest in that it furnishes much authoritative information regarding the life and customs of the natives of the largest of our new possessions. Dr. Frank Russell, formerly of the Bureau of American Ethnology, secured important material from the Pima Indians of southern Arizona, which, together with many ethnological objects from other sources, have been transferred by the Bureau to the custody of the Museum. Several collections made by Lieut. G. T. Emmons, of the United States Navy, illustrating the arts of the Chilcat and other Alaskan tribes, have also been acquired.

An extremely noteworthy collection deposited in the Museum by Mr. S. S. Howland, of Washington, D. C., consists of objects representing Buddhist religious art, such as bronze and wooden images of Buddha and Buddhist saints, shrines, temple lamps, and sacred writings on palm leaves, and also of several oriental manuscripts in Hebrew, Arabic, and other languages. Miss Eliza R. Scidmore, of Washington, also deposited a number of examples of Buddhist and Hindu religious art. Twenty-eight Jewish ceremonial objects from North Africa were obtained from Mr. Ephraim Deinard, of Kearney, New Jersey, one of the most interesting pieces being an ark of carved

wood, containing a parchment scroll of the Pentateuch. The Egyptian exploration fund has presented some valuable Græco-Egyptian papyri.

Among the accessions in the Division of Prehistoric Archeology were a collection of implements and other objects obtained by Mr. W. H. Holmes from near Kimmswick, Missouri, with the assistance of Mr. Gerard Fowke, who also transmitted a number of hammerstones, flint nodules, and other objects from ancient quarries near Carter, Kentucky, and a series of implements and specimens of ore, which had been mined for use as paint, from aboriginal mines at Leslie, Missouri, collected by Mr. Holmes. About 3,000 specimens of stone implements, gathered by the late Mr. Frank Hamilton Cushing, including spearheads, arrowpoints, harpoons, and tools of various kinds, and a very important collection made by Dr. J. Walter Fewkes in Porto Rico and Santo Domingo were received from the Bureau of American Ethnology. The material from Santo Domingo comprises many types new to the Museum, while that from Porto Rico contains several stone rings or collars, sculptured pillow stones, the remains of human skeletons, and various other objects.

A collection of stone implements of various types, pottery, bowls, vases, etc., chiefly from the Mississippi Valley and the Pueblo region, was obtained from Mr. E. O. Matthews, of Parral, Mexico, and many objects illustrative of the stone age in Uruguay were received in exchange from the Museo Nacional at Montevideo, through the courtesy of Señor Luis A. de Herrera, secretary of the Uruguayan legation at Washington. Mr. H. W. Seton-Karr, of London, England, presented a series of paleolithic quartzite implements selected from a collection made by him in the Lateritic deposits near Madras, India.

A series of models of United States war vessels, including gunboats, monitors, protected cruisers, and rams, deposited in the Museum by the Navy Department, forms a very attractive exhibit, being of especial interest to the public. The War Department has also deposited a large number of models of heavy seacoast cannon, mountain howitzers, and other types of ordnance formerly used by the Army, and examples of small arms.

Many relics of General and Mrs. U. S. Grant, of great intrinsic as well as historic value, have been presented to the Museum by their children, through Brig. Gen. Frederick D. Grant, U. S. Army. They include clothing worn by General Grant during the civil war, commissions to different ranks in the Army, a cabinet present to Mrs. Grant by the Empress of Japan, said to be one thousand years old and valued at $20,000; several Japanese vases presented by the Emperor of Japan, a lady's toilet set in gold from the King and Queen of Siam, and numerous other objects.

Eight hundred and thirty-seven gold, silver, and copper coins were donated to the Museum by Mr. E. M. Chapman, of New York City.

Casts of the Neanderthal and Prague ancient crania were purchased for the newly established Division of Physical Anthropology, which has also secured five valuable head-hunter's skulls from New Guinea, and a large series of crania and parts of human skeletons from the Army Medical Museum, the U. S. Fish Commission, and other sources.

The Department of Biology received about 110,000 specimens, of which approximately one-third were botanical. In zoology the Division of Insects led with 37,684 specimens, followed by marine invertebrates with 12,471 specimens, mammals with 7,435 specimens, mollusks with 6,332 specimens, and birds with 3,800 specimens.

The zoological specimens contributed by Dr. W. L. Abbott consisted of a large number of deer, squirrels, porcupines, and a new ape, collected in Sumatra and on the adjacent islands, and in the Riou Linga Archipelago, south of Singapore. Many of the species are new to science. The donations made by Doctor Abbott, as the result of his recent extensive explorations in the East Indies, now comprise about 2,500 mammals and nearly 4,000 birds, besides several thousand specimens in other branches of natural history.

Large collections of bird skins and eggs, fishes, corals, mollusks, crustaceans, and other marine invertebrates, obtained during the expedition of the U. S. Fish Commission steamer *Albatross* to the Hawaiian Islands and to Samoa, have been transmitted to the Museum and will be referred to more in detail in the next report. They include interesting series of the birds of the Laysan Islands.

Dr. E. A. Mearns, U. S. Army, presented a quantity of mammals from the Yellowstone National Park and from Fort Snelling, Minnesota, and the Hon. B. S. Rairden, United States consul at Batavia, two undescribed species of *Tragulus* from Java. An important collection of bats was obtained from Mr. William Foster, of Sapucay, Paraguay; and one of bats and rodents from Mr. T. Tsuchida, of Misaki, Japan. A valuable skeleton of the porpoise, *Pseudorca crassidens*, from the Hawaiian Islands, the first reported from that region, was contributed by Prof. C. H. Gilbert, of the Leland Stanford Junior University.

Several rare birds of paradise and other valuable specimens, including a pair of flightless cormorants, from the Galapagos Islands, were received from Mr. A. Boucard, Isle of Wight, England, and a Javan jungle fowl, a black-winged peacock, and other birds from Mr. Homer Davenport, Morris Plains, New Jersey. The Bishop Museum, of Honolulu, presented about 40 bird skins, including several species not previously represented in the Museum collection, and 295 interesting specimens from Chiriqui, Costa Rica, including a number of cotypes, and 52 bird skins from Honduras were obtained from Mr. Outram Bangs, of Boston, partly as a gift and partly in exchange. The most important accession to the öological collection was a fossil egg of *Aepyornis maximus* from Madagascar. Valuable birds' eggs from

Australia, South America, and other countries were also received from different sources.

Reptiles from southern Florida were contributed by Mr. E. J. Brown, of Lemon City, and a fine series of salamanders was presented by Messrs. Brimley Brothers, of Raleigh, North Carolina. From Prof. P. Biolley, of the National Museum of San Jose, Costa Rica, there were obtained several very interesting specimens, including a new gecko, described by Doctor Stejneger as *Sphærodactylus pacificus*. Eighteen snakes from the island of Cyprus were purchased from Giacomo Cecconi, of Florence, Italy, and 29 snakes from Jamaica and Michigan were donated by Prof. H. L. Clark, of Olivet College, Michigan.

The accessions to the collection of fishes were numerous and important. Dr. O. P. Jenkins, of Leland Stanford Junior University, donated 42 types of Hawaiian fishes, constituting a second installment of a series of types the first of which were transmitted in 1901. A valuable collection of types and cotypes of Japanese fishes was received from Dr. David S. Jordan, president of the same university. A large salmon, weighing about 50 pounds, taken at Cascapedia, Canada, was presented by Dr. S. Weir Mitchell, of Philadelphia. A deep-sea pelican fish, captured at a depth of between 2,000 and 3,000 fathoms, during the survey for the Pacific cable, was transmitted by the officers of the U. S. S. *Nero*, and a large conger eel was received from Mr. Louis Mowbray, of Bermuda, through the New York Aquarium.

Besides the mollusks obtained by the Fish Commission expedition to the Hawaiian Islands, a number of well-preserved land shells from the same region were donated by Mr. W. H. Henshaw, of Hilo, Hawaii. Interesting collections of shells were also received from Rev. Henry Loomis, Yokohama, Japan; Mr. F. A. Woodworth, San Francisco, California; Mrs. T. S. Oldroyd, Burnett, California, and the Imperial Academy of Sciences, St. Petersburg. A specimen of the rare *Voluta mammilla* Sowerby, from Tasmania, and other valuable Australian shells, were also added to the mollusk collection.

Among the most important additions to the Entomological Division were a collection of nearly 19,000 specimens of gall wasps, parasites, etc., from Canada, transmitted by the Department of Agriculture; a series of Costa Rican insects of different orders purchased from Mr. P. Schild, of New York City; about 2,000 specimens of Chilean insects from Mr. E. C. Reed, Concepcion, Chile; 277 specimens of African Lepidoptera received in exchange from the Royal Museum of Natural History, Stockholm, Sweden, through Dr. Yngve Sjöstedt, including examples of several species described by Doctor Aurivellius; a collection of mites, including types and cotypes, from Prof. Robert Wolcott, of the University of Nebraska; specimens of many orders and comprising types and cotypes from Prof. T. D. A. Cockerell, East Las Vegas, New Mexico; about 700 specimens of European Coleoptera

from Dr. W. H. Valway, Cleveland, Ohio, and a valuable series of Venezuelan Cicindellidae and Scarabaeidae from Mr. Edw. A. Klages, of Crafton, Pennsylvania. An important exchange was made with the American Entomological Society, whereby the Museum received 95 species of Mexican and Central American Hymenoptera, including many cotypes. Thirty-four cotypes of Coleoptera were presented by Prof. H. C. Fall, of Pasadena, California.

The Division of Marine Invertebrates obtained through exchange with the Museum of Natural History, Paris, France, about 50 species of fresh-water crabs. A series of Japanese crustaceans, including many interesting specimens collected by Dr. David S. Jordan and Mr. J. O. Snyder, was presented by the Leland Stanford Junior University. A number of crustaceans from the Maldive Islands, collected by Mr. Alexander Agassiz in 1901 and 1902, was received from the Museum of Comparative Zoology, Cambridge, Massachusetts, and similar material from Costa Rica and Cocos Island was acquired through exchange with the National Museum of Costa Rica. Among other accessions of special interest may be mentioned four lots of isopod crustaceans, including types obtained by the Harriman expedition, received from Prof. Trevor Kincaid, Seattle, Washington; 23 specimens of echinoderms and crustaceans from Great Britain and from various localities in the East, contributed by Mr. H. W. Parritt, of London, England; a quantity of foraminifera from Great Britain and the Seychelles Islands, presented by Mr. H. Sidebottom, Cheshire, England, and a collection of parasites of fishes, transmitted by Prof. Edwin Linton, of Washington, Pennsylvania. A very interesting series of European parasites, comprising trematodes, cestodes, and nematodes, was deposited in the Museum by the Bureau of Animal Industry, Department of Agriculture.

To the osteological collection were added a skeleton of the giant salamander, *Siebolldia japonica*, presented by the Imperial Museum of Tokyo; three skeletons of Harris's cormorant, *Nanopterum harrisi*, purchased from Mr. R. H. Beck, of Berryessa, California, and a skeleton of musk ox from Ellesmere Land, representing a species new to the Museum, from Mr. J. S. Warmbath, of Washington, District of Columbia.

The National Herbarium has been enriched by a collection of about 1,400 plants from the Philippine Archipelago, contributed by the Philippine Bureau of Agriculture, and by another collection from the same locality received from the Royal Botanical Gardens, Kew, England. Mr. William R. Maxon, of the Museum staff, obtained a large collection of ferns and other plants during a collecting trip of about two months' duration in Jamaica. Dr. E. A. Mearns, U. S. Army, presented a large series of plants collected in the Yellowstone National Park, and Capt. John Donnell Smith, of Baltimore, Maryland, who has made extensive contributions to the Herbarium, continued hi

donations during the past year, transmitting a series of plants from the West Indies and Central America.

The collections in the Department of Geology were increased by about 102,000 specimens, of which 97,000 were fossil invertebrates. As in past years, the principal accessions were from the U. S. Geological Survey. Among the more important ones were a series of minerals, rocks, and ores, constituting a portion of the exhibit made by the Survey at the expositions recently held in Buffalo and Charleston, and a collection of rocks from Arizona, California, Idaho, Colorado, Oregon, and Washington. An interesting lot of tourmalinitic quartz from Little Pipestone district, Montana, of which some of the specimens are covered on one side with parallel layers of amethysts of different hues, accompanied the former.

A valuable series of massive and cut polished stalactites and stalagmites from the Copper Queen mine was presented by Mr. James Douglas, of Bisbee, Arizona. Interesting examples of volcanic bombs and lavas from Cinder Buttes, Idaho, were received from Prof. I. C. Russell; specimens of fluorite and associated rocks, from Mr. R. S. Bassler and Mr. E. O. Ulrich; specimens of halloysite from Hart County, Kentucky, from Hon. J. H. Stotsenburg, of New Albany, Indiana; specimens of talc, from the North Carolina Talc and Mining Company, and a collection of igneous rocks from Holyoke, Massachusetts, from Prof. B. K. Emerson.

A specimen of pallasite, weighing 351 pounds, from Mount Vernon, Kentucky; a mass of meteoric iron from Arispe, Mexico, weighing 116 pounds; a mass of meteoric iron from Persimmon Creek, in North Carolina, weighing 9 pounds, and a meteoric stone weighing nearly 9 pounds, from Hendersonville, North Carolina, are among the most important additions to the meteoric collections.

A small piece of the only known specimen of footeite was donated by Mr. Warren M. Foote, of Philadelphia, and many very desirable minerals, some of which were not previously represented in the Museum collection, were obtained from different sources.

The largest and most valuable addition to the Division of Stratigraphic Paleontology was the second installment of the E. O. Ulrich collection of Paleozoic bryozoans, comprising about 75,000 specimens and 2,500 microscopic slides. The collection as a whole is the most extensive of its kind in existence and contains many unique specimens. About 14,000 corals, crinoids, mollusks, and other fossil invertebrates from the Mississippi Valley Paleozoic were received from Dr. Carl Rominger, of Ann Arbor, Michigan. Many of these have been figured and described in the reports of the Geological Survey of Michigan. The Andrew Sherwood collection of Pennsylvania Upper Devonic vertebrate and invertebrate fossils is also entitled to special notice. It was brought together by Mr. Sherwood, and includes many choice slabs filled with large brachiopods and mollusks, besides about 3,000

small specimens. Smaller collections of interesting fossil invertebrates were contributed by the U. S. Geological Survey; Dr. Charles E. Beecher, of Yale University; Mr. John M. Nickels, of Cincinnati, Ohio; Mr. W. T. Lee, of Trinidad, Colorado, and others.

The collection of vertebrate fossils was increased by several important additions, one of which, comprising the teeth of *Mastodon humboldti* and *Mastodon cordillerum* and casts of mandibular rami, was received from the British Museum, London, England. Dr. H. J. Herbein, of Pottsville, Pennsylvania, contributed a slab of sandstone showing reptilian footprints, from Mount Carbon, Pennsylvania, and Mr. Whitman Cross, of the U. S. Geological Survey, collected and transmitted a tooth of *Cladodus formosus* (Hay) from Needle Mountains quadrangle, Colorado.

About 500 specimens of Triassic plants, collected in Connecticut and Massachusetts by Mr. S. Ward Loper, of the U. S. Geological Survey, have been turned over to the Museum; a small series of fossil plants from the Permian of Ohio was donated by Mr. H. Herzer, of Marietta, Ohio, and about 80 specimens of Paleozoic plants were received with the Ulrich collection above mentioned.

The number of entries made in the catalogue books of the various departments was 41,091.

The number of accessions received annually since 1881 has been as follows:

Year.	Accession Nos. (inclusive).	Number of accessions during the year.
1881	9890–11000	1,111
1882	11001–12500	1,500
1883	12501–13900	1,400
1884	13901–15550	1,650
1885 January to June	15551–16208	658
1886	16209–17704	1,496
1887	17705–19350	1,646
1888	19351–20831	1,481
1889	20832–22178	1,347
1890	22179–23340	1,162
1891	23341–24527	1,187
1892	24528–25884	1,357
1893	25885–27150	1,266
1894	27151–28311	1,161
1895	28312–29534	1,228
1896	29535–30833	1,299
1897	30834–32300	1,467
1898	32301–33741	1,441
1899	33742–35238	1,497
1900	35239–36705	1,467
1901	36706–38175	1,470
1902	38176–39584	1,409
1903	39585–41227	1,643

The approximate number of specimens received by the Museum during the year and the total number in the possession of the Museum at the close of the year are recorded in the following table:

Division.	Received in 1902-3.	Total.
Anthropology:		
Ethnology	4,547	478,064
Historic archeology	20	2,223
Prehistoric archeology	16,181	372,979
Technology	149	31,193
Graphic arts	1,502	8,896
Medicine	7	6,889
Religions	92	2,769
History and biography	1,502	43,048
Physical anthropology	99	2,770
Ceramics	146	4,610
Photography	9	1,800
Music	65	1,625
Biology:		
Mammals	7,435	82,435
Birds	3,800	133,535
Birds' eggs	1,470	64,045
Reptiles and batrachians	[a] 872	44,425
Fishes	1,000	157,501
Mollusks	6,332	929,037
Insects	37,684	1,523,684
Marine invertebrates	12,471	518,726
Helminthology	[a] 646	5,737
Comparative anatomy	[a] 115	15,945
Plants	38,403	564,405
Forestry	.....	749
Geology:		
Physical and chemical geology	2,820	78,559
Mineralogy	[a] 415	35,878
Invertebrate paleontology	97,000	543,337
Vertebrate paleontology	[a] 36	
Paleobotany	1,732	
Total	236,580	5,654,864

[a] Entries in catalogues.

EXPLORATIONS.

Fewer explorations than usual were carried on last year directly by the Museum, owing to insufficient means for that purpose. Field work under the Bureau of American Ethnology, which yielded interesting collections of objects, since deposited in the Museum, as before mentioned, was conducted by Mr. William H. Holmes, Mr. Gerard Fowke, and Dr. J. Walter Fewkes. Mr. Holmes visited the aboriginal hematite mines at Leslie, Missouri, and Doctor Fewkes an ancient quarry in Carter County, Kentucky, while Doctor Fewkes also spent considerable time in Santo Domingo and Porto Rico.

The important explorations of Dr. William L. Abbott in Sumatra and the adjoining islands, as well as on the mainland of the Straits

Settlements, have already been referred to under the heading of "Additions to the Collections." These explorations, which are carried on entirely at the expense of Doctor Abbott, have now been in progress for several years, and through his generosity the National Museum has been the fortunate recipient of the very large and extremely valuable collections that he has made.

In the spring of 1903 Mr. F. A. Lucas, accompanied by Mr. William Palmer and Mr. J. W. Scollick, all of the Museum staff, visited one of the stations of the Cabot Steam Whaling Company on the coast of Newfoundland in the interest of the St. Louis Exposition for the purpose of securing as complete a representation as possible of a large sulphur-bottom whale. He was entirely successful, returning with a perfect skeleton of a specimen measuring about 78 feet long, and with molds of the exterior, from which a cast of the entire animal will be made. These specimens at the close of the exposition will be exhibited in the Museum.

Through the courtesy of the Geographical Society of Baltimore, the Museum was enabled to send Mr. B. A. Bean and Mr. J. H. Riley with an expedition to the Bahama Islands, where they were to make collection of the fishes and land animals of that region. The party was still absent at the close of the year.

Dr. H. G. Dyar, with Mr. Rolla P. Currie, of the National Museum, and Mr. A. N. Caudell, of the Department of Agriculture, accompanied an expedition to British Columbia under the auspices of the Carnegie Institution, and it is expected that they will bring back a large and important collection of insects.

Mr. S. Ward Loper, of the U. S. Geological Survey, made for the Museum an interesting collection of Triassic plants in Connecticut and Massachusetts, and through arrangements with the Director of the Survey, Hon. Charles D. Walcott, Mr. Charles Schuchert, of the Museum staff, spent several weeks in Virginia and Georgia with the special view of determining the geological horizons of the southern part of the Appalachians. Incidental to this study he collected many fossils. Several weeks were spent by Mr. R. S. Bassler in Ohio, Indiana, and Kentucky collecting invertebrate fossils. A small collection of natural history specimens, obtained about Franz Josef Land by the Baldwin-Ziegler expedition of 1902 to the Polar regions, was presented to the Museum by Mr. William Ziegler. It is hoped that the second expedition, now in progress under the same auspices, will result in additional accessions from that little-known region.

DISTRIBUTION AND EXCHANGE OF SPECIMENS.

The number of specimens furnished to specialists outside of the Museum for study was 12,529, almost twice as many as during the previous year, while the sets of duplicates distributed to educational

establishments in this country, together with those used in making exchanges with individuals and institutions both at home and abroad, comprised 33,228 specimens. The educational series consisted of marine invertebrates, fishes, and geological material illustrating the results of rock weathering and soil formation.

The following table shows the number of lots of specimens of all kinds sent to each State and foreign country:

Alabama	1	North Carolina	6
Arkansas	1	Ohio	11
California	12	Pennsylvania	25
Colorado	4	Texas	4
Connecticut	11	Utah	4
District of Columbia	18	Vermont	1
Delaware	1	Washington	2
Georgia	3	West Virginia	1
Illinois	46	Wisconsin	5
Indiana	7	Wyoming	2
Iowa	8	Hawaii	2
Kansas	1	Philippine Islands	1
Kentucky	2	Austria	5
Louisiana	1	Bavaria	1
Maine	2	Canada	3
Maryland	7	Denmark	2
Massachusetts	36	England	12
Michigan	11	France	7
Minnesota	5	Germany	4
Missouri	18	Holland	1
Montana	2	Italy	5
Nebraska	2	New South Wales	1
New Hampshire	4	New Zealand	1
New Jersey	12	Norway	2
New Mexico	2	Sweden	3
New York	99		

Among the more important exchanges received from foreign establishments were the following: From the British Museum of Natural History, London, four casts of the jaws and teeth of mastodons; the Royal Botanic Gardens, Kew, London, 983 plants from the Philippine Islands and Guiana, 21 duplicate plates from "Refugium Botanicum," and two living plants; the Museum of Natural History, Paris, four species of Argulidæ from South America; the Botanical Museum, Berlin, Germany, 665 plants from Europe and Africa; the Royal Zoological and Anthropological-Ethnographical Museum, Dresden, small mammals and a specimen of *Scops manadensis* from Celebes; the K. K. Naturhistorisches Hofmuseum, Vienna, 100 specimens of European cryptogams; the Royal Museum of Natural History, Stockholm, 277 specimens of Lepidoptera; the Imperial Academy of Sciences, St. Petersburg, 102 specimens of land and fresh-water shells from Central Asia; the Royal Museum, Turin, specimens of fossil Nummulites and Orbitoides; the Royal Gardens, Calcutta, 120 plants from India; the

Botanic Gardens, Durban, Natal, 100 South African plants; the Botanic Gardens, Sydney, New South Wales, 30 plants from New South Wales; the Museo Nacional, Montevideo, Uruguay, 35 paleolithic implements.

The material obtained in exchange from individuals abroad was as follows: From Mr. W. E. Helman, London, 30 birds' eggs from Iceland and England; from Mr. H. W. Parritt, London, 23 specimens of echinoderms and crustaceans; from Mr. B. W. Priest, Norfolk, England, 4 boxes of foraminifera from the island of Jersey; from Mr. H. Sidebottom, Cheadle Hume, near Stockport, Cheshire, foraminifera from Great Britain and the Seychelles Islands; from M. Ernest André Haute-Saône, France, 10 specimens including 4 cotypes of Mutillids; from M. Georges Lachenaud, Limoges, France, 30 specimens of European mosses and hepatica; from M. Stanislas Meunier, Museum of Natural History, Paris, a meteorite from Tadjera, Algiers; from M. Phileas Rousseau, Notre Dame de Mont, Vendee, 19 specimens of trilobites, 5 of *Bellerophon* and other fossils from the Silurian formation of France; from Mr. A. Callier, Rosswein, Saxony, 273 plants from Russia; from Dr. Aristides Brezina, Vienna, meteorites from Jellica, Merciditas, and San Juliao; from Mr. Julius Böhm, Vienna, a piece of meteorite from Erghes, Somaliland, Africa, weighing 427 grams; from Mr. Embr. Strand, Christiania, Norway, 261 specimens of Lepidoptera and 20 specimens of Orthoptera; from Mr. G. van Roon, Leiden, Holland, 120 specimens of Coleoptera; from Dr. K. Kishinouye, Imperial Fisheries Bureau, Tokyo, Japan, photographs of Japanese corals; from Dr. T. H. Holland, director of the Geological Survey of India, a meteorite from Shergooty, India; from Mr. F. H. McK. Grant, North Carlton, Melbourne, Australia, a specimen of Upper Silurian starfish and a specimen of Lower Silurian cephalopod; from Dr. A. Dugès, Guanajuato, Mexico, 32 insects.

RESEARCHES.

Under the act of Congress founding the Smithsonian Institution the Museum staff is charged with the classification and arrangement as well as with the care and preservation of the national collections, and although many of the accessions have been previously worked up, the greater number reach the Museum unstudied and unnamed.

In selecting the assistants in every grade, therefore, it has been necessary from the beginning to consider their qualifications with reference to expert knowledge of the groups of specimens to be placed under their charge, and in this manner a very effective though small staff of paid scientific workers has been assembled. The greater part of the time of these assistants has, naturally, to be given to the routine duties attendant upon the receipt, assorting, labeling, cataloguing, and disposition of the collection as received, but by working outside the

official hours, a characteristic of every zealous man of science, they are to be credited every year with important progress in classification and in other studies. Besides the paid assistants, however, there are nearly as many volunteer or honorary members of the scientific staff, filling positions for which the appropriations are insufficient to make provision, and from these also extensive results in the elaboration of collections are obtained. But notwithstanding these facts the Museum depends to a large extent, for the study of its collections, on the cooperation of scientific men belonging to other institutions, their work being done gratuitously, and frequent calls are made upon its resources to aid in researches conducted under other auspices.

In the Department of Anthropology, Prof. O. T. Mason, the Acting Head Curator, was mainly occupied in completing his revised paper on aboriginal basketry which is to appear as an appendix to the Annual Report for 1902. Dr. A. Hrdlicka, Assistant Curator of Physical Anthropology, made a study of the Lansing skeleton, including an examination of other material. A description of the Parsee creed and ceremonials represented in the collections of the Museum was prepared by Dr. I. M. Casanowicz and published in the American Anthropologist. Dr. Cyrus Adler and Dr. Casanowicz continued their work on a bibliography of Assyriology.

Among the investigators from other places who were given facilities for making studies on anthropological subjects were M. Pittier, head of the National Museum of Costa Rica; Dr. Carl von den Steinen, of Berlin; Dr. Hjalmar Stolpe, director of the Royal Museum of Sweden at Stockholm; Prof. Hartmann, of Stockholm; Dr. A. B. Hunter of Raleigh, N. C.; Dr. E. A. Bogue, of New York City; and Dr. Waldemar Bogoras, of the American Museum of Natural History. Doctor Bogoras's visit was made in the interest of his explorations among the tribes of northeastern Siberia and for the purpose of ascertaining whether any material of Siberian origin was contained in the extensive Eskimo collection of this Museum.

In the Department of Biology Mr. G. S. Miller, jr., Assistant Curator of Mammals, gave special attention to the working up of Doctor Abbott's collections of East Indian mammals, in which he has already discovered 17 new species of mouse deer (genus *Tragulus*), 16 new species belonging to other orders, and one new genus (*Lenothrix*). In the Museum collection of American bats, he has found 20 undescribed species, diagnoses of which have been published in the proceedings of the Philadelphia Academy of Natural Sciences. He has also prepared notes on a number of species of bats and rodents. Dr. E. A. Mearns, U. S. Army, made a study of the ocelots, the results of which were printed in the Museum Proceedings. Dr. M. W. Lyon, jr., has completed a list of the type specimens of mammals, exclusive of cetaceans, in the collections of the Museum, which number 469 species

and subspecies. Photographs of the types are still to be prepared. Doctor Lyon has also pursued investigations on the osteology of the rabbits, and has published two brief notes on other mammals. The head curator of biology, Dr. Frederick W. True, completed an extensive and important monograph on the North American and European species of whalebone whales, his manuscript being submitted for publication toward the close of the year. He also prepared papers on Doctor Philippi's species of Chilean porpoises, on a killer whale stranded on the coast of Maine, and on a species of *Prodelphinus* obtained at Honolulu; and notes on the name of the common porpoise of the genus *Tursiops*, and on the occurence of the pollack whale, *Balaenoptera borealis*, in American waters.

The second volume of Mr. Robert Ridgway's manual of North and Central American birds, containing 854 pages of text and 22 plates, was issued during the year. It deals with the families of Tanagers, Troupials, Honey Creepers and Wood Warblers (Tanagridæ, Icteridæ, Cœrebidæ and Mniotiltidæ), comprising 77 genera and 433 species and subspecies. The preparation of the third volume, covering 15 families, is well advanced, about 400 pages being now in type. A paper by Dr. Charles W. Richmond on the birds collected by Doctor Abbott and Mr. C. B. Kloss, in the Andaman and Nicobar Islands has been published, and Doctor Richmond has also spent much time in working up the Abbott collection of birds from the west coast of Sumatra, and a collection from the South Pacific. He has likewise made considerable progress with the card catalogue of the genera and species of birds. Dr. William L. Ralph continued the preparation of material for a volume on the life-histories of North American birds with special reference to their nests and eggs, supplemental to the unfinished work of the late Major C. E. Bendire, U. S. Army.

Dr. Leonhard Stejneger completed his report on the reptiles of Porto Rico and has been engaged in the investigation of the reptile fauna of Eastern Asia. Papers by Doctor Stejneger on Holbrook's salamander and on the reptiles of the Huachuca Mountains, Arizona, were published by the Museum during the year.

In connection with an extensive work on the Tertiary mollusks of Florida, Dr. W. H. Dall prepared reviews of the recent species of Veneridæ, Carditacea, Cyrenacea, and Astartidæ. Mr. Bartsch continued his studies on the Pyramidellidæ, which were nearly finished at the close of the year.

Dr. W. H. Ashmead continued his work upon the classification of the Chalcid-flies, which is now in course of printing by the Carnegie Museum, and published several papers on the wasps of the groups Vespoidea, Proctotrypoidea, and Cynipoidea. He had also in course of preparation monographs on the North American Braconidæ and the Japanese Hymenoptera, and a catalogue of North American Hyme-

noptera. Mr. D. W. Coquillett was occupied in identifying and arranging the Diptera and completed a revision of the genera of the family Empididæ. A paper by him descriptive of 4 new genera and 94 new species of North American diptera was printed in the Proceedings. Mr. Nathan Banks published 16 papers on spiders and other entomological subjects. A paper on dragon-flies and one on ant-lions, by Mr. Rolla P. Currie, were published by the Entomological Society of Washington. Mr. Currie continued work on a catalogue of North American Neuropteroid insects, and on a monograph of the ant-lions. Mr. August Busck published two papers on the codling-moth and one on a new species of the family Yponomentidæ, and also a revision of the American moths of the family Gelechiidæ. The Museum Proceedings for the year contained a paper by Dr. H. G. Dyar on the larvæ of moths from Colorado, and an additional section of Dr. John G. Smith's monograph of the moths of the family Noctuidæ.

The researches by Dr. J. E. Benedict included a revision of the genus *Lepidopa*, descriptions of new Galatheidæ, Albuneidæ, and Dromidæ, and studies upon the Anomuran crabs collected in Japanese and Hawaiian waters by the Fish Commission steamer *Albatross*, and upon several interesting annelids. Miss M. J. Rathbun continued work on a monograph of the fresh-water crabs based on the collections of the U. S. National Museum, the Muséum d'Histoire Naturelle, Paris, the Museum of Comparative Zoology of Harvard University, and other institutions. She also prepared five short papers on crustaceans which were printed during the year.

Miss Harriet Richardson completed reports on the Isopod crustaceans collected in Hawaii and Japan by the Fish Commission steamer *Albatross*, and in Japan by the U. S. S. *Palos* in 1881, and by Dr. D. S. Jordan and J. O. Snyder in 1900, and also on some cymothoids collected by Dr. C. H. Gilbert on the west coast of Central America, and on the American Epicaridea in the U. S. National Museum.

Dr. C. W. Stiles, Custodian of the helminthological collections, made an extended investigation of a parasitic disease prevalent among the people of the Southern States, which he found to be due to the attacks of an undescribed species of hook-worm, *Uncinaria americana*, and carried on inquiries regarding the frequency of the occurrence of parasites in men. He published twelve papers during the year relating to parasitology, three of these having been prepared conjointly with Dr. Albert Hassall and Mr. Charles A. Pfender; and also the first three parts of an index-catalogue of medical and veterinary zoology, with Doctor Hassall as coauthor.

In the Division of Plants, an unusual amount of routine work, especially in connection with the rearrangement of the collections, prevented the accomplishment of much scientific research. A third section of Dr. J. N. Rose's studies of Mexican and Central American plants, and a paper by the same author in conjunction with Mr.

W. B. Hemsley on the genus *Juliania* were printed. Doctor Rose also continued work on the Crassulaceæ of North America conjointly with Doctor Britton, and completed a preliminary paper relating to that group of plants. Mr. C. L. Pollard contributed a number of notes to the Plant World, and described two new violets from the United States. With Mr. T. D. A. Cockerell he also published descriptions of four new plants from New Mexico. Mr. W. R. Maxon continued his studies on the Museum collection of ferns, and Mr. Edward S. Steele completed a monograph on a section of the genus *Laciniaria*.

Access to the collections in biology were accorded during the year to a considerable number of visiting naturalists. The meetings of the American Association for the Advancement of Science, the Society of American Naturalists, and other affiliated societies during convocation week brought together in Washington many prominent investigators, and while their time was limited, some of them took advantage of the opportunity to examine specimens in the line of their specialty. The committee on nomenclature of the American Ornithologists' Union during its meeting from April 16 to 18 made extensive use of the bird collection in determining the status of North American species. Among individual ornithologists to whom the same privilege was given were Prof. W. W. Cooke, Mr. E. W. Nelson, Mr. H. C. Oberholser, and Mr. W. H. Osgood, of the Department of Agriculture; Mr. Outram Bangs, of Boston; Dr. J. Dwight, jr., of New York City; and Mrs. Florence Merriam Bailey, of Washington.

Mr. Thomas Barber, of Cambridge, Massachusetts, was here for some time studying the Old World chameleons, which he proposes to monograph. Among students of entomology who conducted work at the Museum were Dr. W. J. Holland, Director of the Carnegie Museum, Pittsburg, Pennsylvania; Prof. John B. Smith, of Rutgers College, New Brunswick, New Jersey; Dr. James A. G. Rehn and Mr. J. Chester Bradley, of Philadelphia, Pennsylvania; Mr. H. H. Ballou, of Amherst, Massachusetts, and Dr. Walter Horn, of Berlin, Germany.

Prof. W. P. Hay, of Howard University, Washington, continued his studies upon crayfishes and other fresh-water crustaceans, and completed descriptions of the species collected by himself at Mammoth Cave, Kentucky, and Nickajack Cave, Tennessee, and by Dr. C. H. Eigenmann in Cuba. Prof. G. I. Hamaker, of Trinity College, Durham, North Carolina, examined the specimens of *Crianthus;* Miss Katherine J. Bush, of the Peabody Museum of Yale University, certain type specimens of Annelids, and Dr. S. J. Holmes, of the University of Michigan, certain species of Amphipod crustaceans.

The principal visiting botanists have been Dr. N. L. Britton, Director of the New York Botanical Garden; Dr. L. M. Underwood, of Columbia University, New York City; Mr. Theodor Holm, of Brookland, District of Columbia; and Dr. E. L. Greene, of the Catholic University, Washington.

The herbarium has also been constantly utilized by the botanists of the Department of Agriculture.

A large amount of material from the Department of Biology was lent to specialists for study or sent to them for working up in the interest of the National Museum. The Biological Survey of the Department of Agriculture had the use of many specimens of mammals, and specimens of the same group were sent out of the city as follows:

To Mr. James A. G. Rehn, of the Philadelphia Academy of Natural Sciences, 41 specimens of several groups for use in his report on terrestrial vertebrates collected in portions of southern New Mexico and western Texas, besides 14 specimens of *Nyctinomus;* to Mr. D. G. Elliot, of the Field Columbian Museum, 35 specimens for use in connection with his work on the mammals of Middle America; to Dr. J. A. Allen, of the American Museum of Natural History, 108 specimens for use in connection with his study of the mammals of eastern Siberia; to Mr. J. L. Bonhote, of the British Museum of Natural History, who is making a study of the Malayan fauna, 18 skins and skulls of *Mus;* to Dr. John M. Ingersoll, of Cleveland, Ohio, who is working upon the comparative anatomy of the ithmoid region of the mammalian skull, 16 specimens of skulls; to Dr. Harris H. Wilder, of Smith College, for use in embryological studies, specimens of the embryo of *Manis javanica;* to Dr. E. A. Mearns, U. S. Army, stationed at Fort Snelling, Minnesota, 9 specimens of mammals from the Philippine region; and to Mr. Witmer Stone, of the Academy of Natural Sciences, Philadelphia, specimens of *Nycticebus.*

The Division of Birds furnished 13 specimens of *Parus hudsonicus*, and 68 specimens, mainly of *Otocoris*, to Mr. Frank M. Chapman, of the American Museum of Natural History; 8 specimens from the Malay Peninsula, Java, and Sumatra to Mr. Witmer Stone, of the Academy of Natural Sciences, Philadelphia; 29 specimens of plover to Dr. Jonathan Dwight, jr., of New York City; and smaller lots to Mr. Walter K. Fisher and Mr. Joseph Grinnell, of Palo Alto, California; Mr. Outram Bangs, of Boston; Mr. W. C. Ferril, of the State Historical and Natural History Society, Denver, Colorado; Dr. R. M. Strong, of Haverford College; Mr. Carl Hellmayr, of the Zoological Museum, Munich, Bavaria, and Mr. W. A. Bryan, of the Bishop Museum, Honolulu.

The loans from the Division of Insects have been numerous and included several large lots requested for monographic purposes. The principal sendings were as follows: A large quantity of material, chiefly representing Odonata and Plecoptera to Prof. James G. Needham, of Lake Forest University, Illinois; about 2,500 bees of the family Andrenidæ to Mr. H. L. Viereck, of the Academy of Natural Sciences of

Philadelphia; over 600 specimens, mostly of Dermaptera and Orthoptera, to Mr. James A. G. Rehn, of the same academy; 285 specimens of Odonata to Dr. Philip P. Calvert, also of the Philadelphia Academy, 1,883 specimens of Sphecidæ to Dr. H. C. Fernald, of Amherst, Massachusetts; 1,570 specimens of Ptinidæ to Prof. H. C. Fall, of Pasadena, California; 532 specimens of Jassoidea, for use in writing up the Mexican and Central American species of this group for the Biologia Centrali-Americana, to Prof. Elmer D. Ball, of the State Agricultural College of Utah; over 200 specimens of Nomadidæ to Prof. T. D. A. Cockerell, of East Las Vegas, New Mexico; 1,000 specimens of Myriapoda to Dr. Karl M. Friedr. Kraepelin, Naturhistorisches Museum, Hamburg, Germany; specimens of the families Multillidæ, Thynnidæ, Myrmaridæ, etc., to M. Ernest Andre, of Gray, France; 106 specimens of Ophionids, to Dr. E. P. Felt, New York State entomologist; 55 specimens of Fulgoridæ to Mr. Otto H. Swezey, of the Ohio State University; 125 specimens of Tettigidæ to Prof. J. L. Hancock, of Chicago, Illinois; specimens of Tabanidæ to Prof. J. S. Hine, of the Ohio State University; specimens of Lepidoptera to Dr. W. J. Holland, of the Carnegie Museum, Pittsburg; specimens of Cephidæ to Mr. J. Chester Bradley, of the Academy of Natural Sciences of Philadelphia; specimens of Fulgoridæ to Prof. W. S. Blatchley, State geologist of Indiana; specimens of Noctuidæ to Prof. John B. Smith, of Rutgers College, New Jersey; and specimens of Hemiptera to Prof. R. Uhler, of Baltimore.

A number of specialists connected with other institutions are engaged in studying for the Museum the entire material of several groups of marine invertebrates, and all report satisfactory progress at the close of the year. Prof. Charles L. Edwards, of Trinity College, Hartford, has the pedate holothurians; Prof. Hubert Lyman Clark, of Olivet College, Michigan, the apodal holothurians; Prof. C. C. Nutting, of the University of Iowa, the hydroids, of which he has nearly ready a monograph of the Sertularia; Dr. Charles B. Wilson, of the State Normal School, Westfield, Massachusetts, the parasitic copepods, one family of which, the Argulidæ, was completed and reported on during the year; Mr. R. W. Sharpe, of Wilmette, Illinois, the ostracoda; Mr. T. Wayland Vaughan, of the U. S. Geological Survey, the madreporarian corals, and Prof. A. G. Mayer, scientific director of the museum of the Brooklyn Institute of Arts and Sciences, who is finishing the uncompleted studies of the late Prof. Alpheus Hyatt, on the Museum collection of Achatinellidæ.

Material from the Division of Marine Invertebrates was also sent out during the year as follows: To Dr. R. P. Bigelow, of the Massachusetts Institute of Technology, the stomatopods collected by the Fish Commission steamer *Albatross* in Hawaiian and Samoan waters, for report; to Prof. H. Coutière, of the École Supérieure de Pharmacie,

Paris, the Alpheidæ obtained on the same expedition and the general museum collection of this group, for monographing; to the Rev. T. R. R. Stebbing, of Tunbridge Wells, England, new species of amphipods from Costa Rica and Cocos Island; to Dr. S. J. Holmes, of the University of Michigan, specimens of New England amphipods; to Dr. J. P. McMurrich, of the same university, specimens of Atlantic coast actinians; to Dr. C. B. Davenport, of the University of Chicago, specimens of fresh-water polyzoa from Maine.

From the Division of Plants the principal loans were as follows: To Mr. Oakes Ames, the Ames Botanical Laboratory, North Easton, Massachusetts, about 400 specimens of orchids; to Dr. L. M. Underwood, of the New York Botanical Garden, specimens of ferns from Porto Rico, Guatemala and Cuba; to Dr. P. A. Rydberg, of the same establishment, 217 specimens; to Dr. John K. Small, also of the New York Garden, several specimens of different groups; to Dr. B. L. Robinson, of the Gray Herbarium of Harvard University, 272 specimens; to Mr. C. S. Sargent, of Harvard University, specimen of *Hoeoria;* to Mr. C. D. Beadle, of the Biltmore Herbarium, 287 specimens of *Rudbeckia*, 322 of *Coreopsis*, and representatives of other groups; to Prof. William Trelease, director of the Shaw Botanical Garden, St. Louis, specimens of yucca; to Mr. R. F. Griggs, of the Ohio State University, specimens of Porto Rican and Guatemalan plants; to Dr. C. E. Waters, of Johns Hopkins University, specimens of *Phegopteris;* to Mr. Aven Nelson, of the University of Wyoming, 69 specimens; to Mrs. Caroline W. Harris, of Ticonderoga, New York, specimens of *Umbilicaria* and *Sticta;* to Mr. E. G. Baker, of the British Museum of Natural History, specimens of *Laciniaria;* to the Royal Botanical Garden, Kew, London, four plants; to Mr. C. L. Shear, Bureau of Plant Industry, Washington, District of Columbia, specimens of fungi; to Mr. Theodor Holm, of Brookland, District of Columbia, specimens of *Carex*, *Scirpus*, *Betula*, *Lychnis*, etc.

In the Department of Geology Mr. Wirt Tassin conducted investigations upon the meteorites in the Museum collection and Mr. W. C. Phalen made a study of the rock specimens collected in Greenland in 1897 by Mr. Charles Schuchert and Mr. David White. Mr. Schuchert continued his researches on the Lower Devonic fauna and completed a study of the Cystidea of the Manlius and Coeymans formations. Mr. R. S. Bassler has in preparation papers on fossil Bryozoa and Ostracoda, one of these reviewing the Bryozoa of the Rochester shale being well advanced.

Among the visitors to this department were Mr. G. C. Martin and Mr. M. V. Twitchell, of the Maryland State Geological Survey, who worked upon the collection of fossils from the Miocene formation in Maryland; Mr. F. B. Laney, of the Geological Survey of North Carolina, who studied the collection of building stones in preparation

for work along this line in North Carolina; Dr. Arthur Hollick, assistant curator of botany in the New York Botanical Gardens, who made examinations of fossil plants in connection with his work on the island series of the Upper Cretaceous in preparation for his proposed investigations on the Yukon River during the summer of 1903; and Prof. H. F. Osborn, Dr. S. W. Williston, Dr. O. P. Hay, Mr. J. B. Hatcher, and Dr. William Patten, all of whom are carrying on researches of greater or less extent upon fossil vertebrates.

Among the most important loans and gifts made from this department during the year were material furnished to the Division of Chemistry and Physics of the U. S. Geological Survey, and the Division of Roads and the Bureau of Soils of the Department of Agriculture; specimens of Upper Carboniferous insects to Dr. C. E. Beecher, of the Peabody Museum of Yale University; specimens of Crinoids to Prof. A. W. Grabau, of Columbia University; specimens of Tertiary insects to Prof. S. W. Williston, of the University of Chicago, for monographic work; a large number of Carboniferous insects to Dr. Anton Handlirsch, of the Royal Austrian Museum, Vienna, also for monographic work; and a large number of Lower Siluric graptolites from New York, Vermont, and Massachusetts, to Dr. John M. Clarke, State paleontologist of New York.

PROGRESS IN THE INSTALLATION OF THE EXHIBITION COLLECTIONS.

The overcrowded condition of the public halls which began a num- of years ago precludes any extensive additions to the exhibition series, and this must continue until the completion of the new building recently authorized by Congress. Small objects can be given a place here and there, but any considerable changes are rendered possible only through the withdrawal and transfer to storage of collections already on display. During the past year the principal progress made in this connection has had reference to improvements in the methods and details of installation.

In the Department of Anthropology temporary accommodations have been furnished on the gallery of the north-west court for the important ethnological collections from the Philippine Islands displayed at the Pan-American Exposition. The entire Eskimo collection has been gone over, and the large series of specimens secured by the Museum-Gates expedition has been arranged in the storage-cases of the Pueblo court. The labeling of the historical collections has been completed, and new case labels have been prepared for the Divisions of Historic and Prehistoric Archeology and for the section of historic religious ceremonials. The cases containing the manuscripts and various editions of the Bible were repainted, and the collections rearranged to facilitate their examination by visitors.

The work of completing the exhibition series in several of the divisions of the Department of Biology, and of improving their appearance by changes in methods of installation, has been vigorously pushed. Progress in this regard was most noticeable in the halls devoted to mammals, marine invertebrates, insects, and fishes. About 200 case labels have been added to the exhibits of mammals, birds, reptiles, batrachians, insects, and the lower invertebrates, and a series of case labels for the collection of comparative anatomy has been completed.

The interiors of the wall-cases, in the galleries of the south hall containing Old World mammals, have been repainted in a color similar to that used in the corresponding cases on the main floor, and this change has resulted in displaying the specimens to much better advantage. A similar change has also been made in regard to the floor cases in the gallery containing small mammals. Three new cases have been constructed against the south wall of this hall. One contains the North American weasels and related forms; the two others, the smaller South American mammals. The cases on the main floor of the south hall have been furnished with new fittings, so that they are now uniform in design and color. The labeling of the American small mammals has been greatly improved, while the labels for the Old World series have been revised and very largely replaced with new ones.

Considerable improvement has been made in the appearance of the exhibition of marine invertebrates, which occupies the west hall in the Smithsonian building. The interior of all the wall-cases has been repainted in black, as furnishing a better background for the corals and sponges than the maroon formerly employed. The display of insects in the next adjoining hall or corridor has been enlarged by extensive additions to the systematic series of North American insects, which it is hoped to complete during the coming year.

The wall cases in the south-east range of the Museum building have been reconstructed, and the systematic collection of casts of North American fishes has been rearranged and installed to much better advantage than formerly. A number of casts of large and striking species have been repaired and repainted. The labeling of the casts of reptiles and batrachians exhibited in floor cases in the same range has also been largely revised.

The bird groups displayed in the main hall of the Smithsonian building, sixteen in number, have been partly renovated, and one of them, consisting of three fine specimens of the Argus pheasant, presented to the Museum some years age by Dr. W. L. Abbott, has been entirely remounted, making it the most striking feature of the room.

Many important changes have been made in the halls containing the geological collections. The exhibit of geographic ores in the southwest court has been carefully overhauled, the cases being thoroughly

cleaned and the specimens rearranged. The nonmetallic minerals, exhibited in the gallery of the same court, have been similarly worked over. The cases in the west-south range containing the stratigraphic and historical collections have been reconstructed and the specimens rearranged. The collection of fossil plants has been partially rearranged, and new labels have replaced the temporary ones on the Paleozoic specimens. Labels have also been printed for the Triassic plants. To the exhibition of vertebrate paleontology will soon be added a specimen of *Claosaurus*, the preparation of which has occupied nearly a year, and the mounted skeleton of a mastodon obtained at Church, Michigan, in 1901.

VISITORS.

There was, during the past year, a large increase in the number of visitors to the national collections. The total number of persons admitted to the Museum building was 315,307, against 173,888 for 1902, an increase of 81 per cent; and to the Smithsonian building 181,174, against 144,107 for the previous year, an increase of about 26 per cent.

The following tables show, respectively, the attendance during each month of the past year, and during each year beginning with 1881, when the Museum building was first opened to the public:

Year and month.	Smithsonian building.	Museum building.
1902.		
July	10,935	11,829
August	13,601	18,880
September	12,719	19,506
October	59,095	131,448
November	9,032	14,437
December	9,785	13,037
1903.		
January	8,712	13,631
February	9,286	14,455
March	10,722	16,527
April	16,122	26,684
May	11,256	17,443
June	9,909	17,430
Total	181,174	315,307
Approximate daily average on a basis of 313 days in the year	578	1,007

Number of visitors to the Museum and Smithsonian buildings since the opening of the former in 1881.

Year.	Museum building.	Smithsonian building.
1881	150,000	100,000
1882	167,455	152,744
1883	202,188	104,823
1884 (half year)	97,661	45,565
1884–85 [a]	205,026	105,993
1885–86	174,225	88,960
1886–87	216,562	98,552
1887–88	249,665	102,863
1888–89 [a]	374,843	149,618
1889–90	274,324	120,894
1890–91	286,426	111,669
1891–92	269,825	114,817
1892–93 [a]	319,930	174,188
1893–94	195,748	103,910
1894–95	201,744	105,658
1895–96	180,505	103,650
1896–97 [a]	229,606	115,709
1897–98	177,254	99,273
1898–99	192,471	116,912
1899–1900	225,440	133,147
1900–1901 [a]	216,556	151,563
1901–2	173,888	144,107
1902–3	315,307	181,174
Total	5,096,649	2,725,789

[a] Years of Presidential inauguration.

MEETINGS AND LECTURES.

In accordance with the custom of previous years, certain scientific societies and other bodies were allowed the use of the lecture hall in the Museum building for the purpose of holding meetings and giving lectures, as follows:

On September 26, 1902, the associates and friends of Maj. John Wesley Powell gathered here to commemorate the life and services of this distinguished public man, the founder and director of the Bureau of American Ethnology and for some time Director of the Geological Survey, whose lamented death occurred but three days before.

From November 18 to 20 a national conference of the various Audobon societies of the United States was held, in conjunction with the American Ornithologists' Union.

On November 22 Prof. John Ritchie, jr., of the Yerkes Observatory, delivered under the auspices of the Smithsonian Institution an interesting lecture on Recent Celestial Photography.

On November 25 Dr. L. O. Howard, Entomologist of the Department of Agriculture and Honorary Curator of Insects in the National Museum, lectured on the subject of Entomology before an audience composed largely of officers of the United States Army and Navy.

On December 27 several interesting talks, illustrated with lantern slides, were given by members of the Society for the Preservation of Wild Flowers.

In the evening of January 1, 1903, an informal reception was tendered to the members of the American Association for the Advancement of Science, the American Society of Naturalists, and other affiliated societies, then in session in this city.

During February and March a course of free Saturday afternoon lectures was given, under the auspices of the Biological Society of Washington, as follows: February 14, An entomologist in China and Japan, by Mr. C. L. Marlatt; February 21, Ancient birds and their associates, by Mr. Frederic A. Lucas; February 28, Views of Liberia, by Prof. O. F. Cook; March 7, The making of new plants, by Mr. H. J. Webber; March 14, Three summers in Alaska, by Mr. Wilfred H. Osgood.

On April 4 the lecture hall was used for the graduating exercises of the Naval Medical School, and on April 14 for those of the Army Medical School.

The National Academy of Sciences held its annual meeting from April 21 to 23, 1903, the business meetings taking place in the offices of the assistant secretary, and the reading of papers in the lecture hall.

CORRESPONDENCE.

One of the most onerous duties which has devolved upon the Museum from the time of its establishment has been the furnishing of information in response to inquiries from the public at large upon all the various subjects within the scope of its several departments. The letters received containing such requests average several daily throughout the year, and are rarely confined to a single subject, often relating to collections of greater or less size which are transmitted for identification. Nearly 900 lots of specimens were received under these conditions during the past year. These communications also have reference, in many cases, to the building up and maintenance of collections, the construction of cases, the installation, labeling, and cataloguing of specimens, and other topics connected with museum administration. Every communication of this character, made in good faith, is responded to as promptly as possible, although the labor involved draws very heavily upon the time of both the scientific and the clerical staffs.

A considerable proportion of the work of furnishing information is accomplished through the medium of Museum publications, of which more than 20,000 volumes and pamphlets were distributed during the year, besides the sendings to regular correspondents.

PUBLICATIONS.

The publications of the Museum have consisted of an annual report, comprising the second part, or volume, of the annual report of the Smithsonian Institution; of a series of Proceedings for the ordinary technical papers, and of a series of Bulletins for the longer technical papers or monographs. In 1894 the National Herbarium, which, for lack of space, had been held at the Department of Agriculture since 1869, was returned to the National Museum, but the publication connected with it and entitled "Contributions from the National Herbarium" established in 1890, continued to be issued by the Department of Agriculture until this year, when Congress, upon the recommendation of the Secretary of Agriculture, transferred its management to the National Museum, in accordance with the following item in the sundry civil act for 1903:

> For printing and publishing the contributions from the United States National Herbarium, the editions of which shall not be less than three thousand copies, including the preparation of necessary illustrations, proof reading, bibliographical work, and special editorial work, seven thousand dollars: *Provided*, That one-half of said copies shall be placed on sale at an advance of ten per centum over their cost.

Under this provision volumes II and VII previously published and entitled respectively Botany of Western Texas, by J. M. Coulter, and Systematic and Geographic Botany and Aboriginal Use of Plants, by Coulter, Rose, Cook, and Chesnut, the editions of which had become exhausted, were reprinted, and also the following new Contributions, parts 1, 2, and 3 of volume VIII, consisting of Studies of Mexican and Central American Plants, by J. N. Rose; Economic Plants of Porto Rico, by O. F. Cook and G. N. Collins; and A Study of certain Mexican and Guatemalan species of *Polypodium*, by William R. Maxon.

Of the Bulletins of the Museum the most important one issued was the second volume of Robert Ridgway's extensive monograph on the Birds of North and Middle America, covering the families Tanagridæ (Tanagers), Icteridæ (Troupials), Cœrebidæ (Honey Creepers), and Mniotiltidæ (Wood Warblers). The third volume, sent to the printer before the close of the fiscal year, treats of the Motacillidæ (Wagtails and Pipits); Hirundinidæ (Swallows), Vireonidæ (Vireos), Ampelidiæ (Waxwings), Ptiliognatidæ (Silken Chatterers), Dulidæ (Palm Chatterers), Laniidæ (Shrikes), Corvidæ (Crows and Jays), Paridæ (Titmice), Sittidæ (Nuthatches), Certhiidæ (Creepers), Troglodytidæ (Wrens), Cinclidæ (Dippers), Chamæiidæ (Wrentits), and Sylviidæ (Kinglets, etc.).

Another noteworthy bulletin was that by Dr. Harrison G. Dyar, of the Division of Insects, entitled A List of North American Lepidoptera and Key to the Literature of this Order of Insects. It is numbered 52, and comprises 723 octavo pages.

The interest manifested in the history and anthropology of our Philippine and other insular possessions rendered desirable the issuance of instructions for the guidance of collectors of objects in these branches, and to secure this purpose there has been printed an additional part of Bulletin 39 (Part Q), prepared by Mr. W. H. Holmes and Prof. O. T. Mason, under the title Instructions to Collectors of Historical and Anthropological Specimens.

The twenty-fourth volume of Proceedings, printed in bound form at the beginning of the fiscal year, contains thirty-four papers (1241 to 1274, inclusive), all of which were issued in the form of separates during the preceding year. Fifteen of these papers were prepared by members of the Museum staff, ten by Dr. David Starr Jordan and his assistants, being mainly descriptions of Japanese fishes represented in the Museum collections, and the remainder by other correspondents and collaborators of the Museum.

Papers numbered from 1275 to 1305, constituting volume XXV, and those numbered from 1306 to 1332 of volume XXVI, were also printed by June 30. It is expected that numbers 1333 to 1349 will soon be published, and that volumes XXV and XXVI will appear in bound form during the summer of 1903.

There is a continuous demand for certain of the Museum publications no longer in stock, but the means this year have permitted the reprinting of only the following: Mr. Robert Ridgway's paper on the Humming Birds, from the Museum Report for 1900; Dr. Stejneger's paper on The Poisonous Snakes of North America, from the Report for 1893; Bulletin 37, entitled A Preliminary Catalogue of the Shell-bearing Marine Mollusks and Brachiopods of the Southeastern Coast of the United States, by Dr. William H. Dall; parts F, G, H, I, J, K of Bulletin 39, containing directions for collecting insects, shells, minerals, rocks, specimens illustrating the aboriginal uses of plants and fossils, and the first volume of Bulletin 47, entitled Fishes of North and Middle America, by Doctors Jordan and Evermann.

All the publications of the Museum are distributed by the Office of Correspondence and Documents, and it is estimated that during the year not less than 10,000 volumes and 35,000 separate papers were sent to libraries and individuals in the United States and foreign countries.

Appendix IV of this report contains a list of the publications of the Museum, of the members of its staff, and also of outside collaborators to the extent that the papers of the latter were based on Museum material. The number of authors is 90, and the total number of papers mentioned by title is 277.

In the following table the publications above mentioned are grouped by subjects:

Subject.	Papers by Museum officers.	Papers by other investigators.	Total.
Bibliography	1	.....	1
Biography	5	.....	5
Birds	15	22	37
Botany	11	3	14
Comparative anatomy	2	3	5
Ethnology	2	.....	2
Exploration	1	.....	1
Fishes	3	19	22
Fossils	14	4	18
General natural history	.....	3	3
Geology	4	4	8
Insects	68	10	78
Mammals	22	1	23
Marine invertebrates	7	7	14
Mollusks	15	.....	15
Parasites	13	.....	13
Physical anthropology	1	.....	1
Religious ceremonials	4	.....	4
Reptiles and batrachians	7	1	8
Miscellaneous	5	.....	5
Total	200	77	277

By permission of the Secretary the following twelve papers, prepared by members of the staff and relating to material in the possession of the Museum, were printed in publications other than those of the National Museum, namely: New Species of Plants from Mexico, by C. L. Pollard (published in the Proceedings of the Biological Society of Washington); An overlooked specimen of *Chilonycteris pilatis*, and six short notes and papers on Chiroptera, by G. S. Miller, jr. (published in the Proceedings of the Biological Society of Washington); Description of a new Quail-dove from the West Indies, by J. H. Riley (published in the Proceedings of the Biological Society of Washington); Pycraft's Classification of the Falconiformes, by Robert Ridgway (published in Science); Descriptions of a New Species of Gecko from Cocos Island, by Leonhard Stejneger (published in the Proceedings of the Biological Society of Washington); On the Manlius Formation of New York, by Charles Schuchert (published in the American Geologist); A newly found Meteorite from Mount Vernon, Christian County, Ky., by George P. Merrill (published in the American Geologist); two papers on new *Tragulí*, by Gerrit S. Miller, jr. (published in the Proceedings of the Biological Society of Washington); Revision of the North American Crassulaceæ, by J. N. Rose, conjointly with Dr. N. L. Britton (published in vol. 2 of the Bulletin of the New York Botanical Garden); On the Faunal Provinces of the Middle Devonic

of America and the Devonic Coral Subprovinces of Russia, with two Paleographic Maps, by Charles Schuchert (published in the American Geologist); A New Land Shell from California, by Paul Bartsch (published in the Proceedings of the Biological Society of Washington).

LIBRARY.

The assignment to the library of two of the galleries erected last year, one in the west-north, the other in the north-west range, has added a considerable amount of space, which has long been needed. This area has been fitted up with convenient stacks, permitting a general overhauling and a more systematic rearrangement of the books and pamphlets. During the latter part of the summer of 1902 the library was closed for a time to enable this work to be carried out. Its contents were classified and a large number of volumes belonging to the Smithsonian deposit were turned over to the Institution for transmission to the Library of Congress.

The increase of the library has been mainly due to two very important gifts—the Hubbard and Schwarz and the Dall collections. The former, consisting of 300 books and 1,500 pamphlets, was brought together by Mr. H. G. Hubbard and Mr. E. A. Schwarz (Custodian of Coleoptera in the Museum), while carrying on their studies more or less conjointly, and forms an accessory to their large collection of insects, presented by them to the Museum several years ago. It is an entomological library, having reference mainly to the American Coleoptera. The contribution by Dr. William H. Dall, Honorary Curator of Mollusks, comprises about 1,600 bound volumes and about 2,000 pamphlets on the mollusca, a special library of great value, which has been accumulated by Dr. Dall during many years of research. It is accompanied by a card catalogue covering the literature of Conchology, both recent and fossil, down to about 1860, though materially added to since then.

The above collections and also the Goode library, purchased in 1898, have been provided with book-plates.

The Museum library now possesses 19,161 bound volumes, and 32,063 unbound pamphlets, periodicals, etc. The cataloguing done during the year comprised 916 books, 1,571 pamphlets, and 9,838 parts of periodicals, and 3,316 cards were added to the authors' catalogue.

The number of books, pamphlets and periodicals borrowed from the general library was 18,750, while the number assigned to the sectional libraries was 4,833. There has been no change in the sectional libraries, which are as follows:

Administration.	Birds.
Administrative assistant.	Botany.
Anthropology.	Children's room.
Biology.	Comparative anatomy.

Editor.
Ethnology.
Fishes.
Geology.
History.
Insects.
Mammals.
Marine invertebrates.
Materia medica.
Mesozoic fossils.
Mineralogy.
Mollusks.
Oriental archeology.
Paleobotany.
Parasites.
Photography.
Prehistoric anthropology.
Reptiles.
Stratigraphic paleontology.
Superintendent.
Taxidermy.
Technology

PHOTOGRAPHY.

Mr. T. W. Smillie, photographer of the Museum, reports that 1,689 negatives, 3,367 silver prints, 307 platinum prints, 49 lantern slides, and 1,016 blueprints have been made, and a large number of prints have been mounted. Under Mr. Smillie's direction much photographic work has also been done for the National Zoological Park and the Astrophysical Observatory, an assistant having been furnished by those bureaus for that purpose.

Mr. Smillie has continued to act as chairman of the board of examiners in photography for the U. S. Civil Service Commission.

COOPERATION OF THE EXECUTIVE DEPARTMENTS OF THE GOVERNMENT.

The Museum has received, as usual, important assistance from several of the Departments and Bureaus of the Government. Its relations to the U. S. Geological Survey, the U. S. Fish Commission, the Biological Survey, and the Divisions of Entomology and Botany of the Department of Agriculture, and the Bureau of American Ethnology, especially in regard to the transmission of collections, have been referred to elsewhere. Officers of the Army and Navy stationed in the new possessions have made valuable contributions, and representatives abroad of the Department of State have been instrumental in securing interesting material. The Departments of War and of the Navy have rendered generous help toward building up the collections of history and of the implements of war, having presented and deposited during the year many objects of exceeding interest and value. The Army Medical Museum has cooperated most liberally in promoting the welfare of the recently established Division of Physical Anthropology, and special acknowledgments are due to the Quartermaster's Department of the Army for many courtesies in connection with the transportation of specimens and outfits to and from distant points.

THE LOUISIANA PURCHASE EXPOSITION.

An act providing for the celebration in the city of St. Louis, Missouri, of the one hundredth anniversary of the acquisition by the United States of the "Louisiana Territory," purchased from France,

was approved by the President of the United States on March 3, 1901. The sundry civil bill for the year ending June 30, 1903, carried an appropriation of $800,000 to enable the Executive Departments, and also the Smithsonian Institution and its bureaus, the U. S. Fish Commission, the Department of Labor, the Library of Congress, and the Bureau of the American Republics, to prepare suitable exhibits for the occasion. Out of this appropriation the sum of $110,000 was allotted to the Smithsonian Institution. Congress also appropriated $450,000 for the construction of a building for the display of the Government collections.

Dr. Frederick W. True, Head Curator of Biology, has been designated by the Secretary of the Smithsonian Institution to represent the Institution and its bureaus on the Government board. The exposition is expected to open on April 30 and to close on November 30, 1904. The preparation of the exhibits under the Smithsonian Institution was well under way at the close of the year, and it is intended that the display made shall surpass any previous efforts by this branch of the Government.

ORGANIZATION AND STAFF.

The organization of the Museum comprises an administrative office and three scientific departments, as follows: Anthropology, with 9 divisions and 4 sections; Biology, with 9 divisions and 13 sections, and Geology, with 3 divisions and 3 sections. This shows an increase of one division in Anthropology and of one section in Biology, the former relating to physical anthropology, the latter to the lower algæ, which have been separated from the higher algæ. At the close of the year the scientific staff consisted of 3 head curators, 17 curators, 13 assistant curators, 15 custodians, 12 aids, 4 associates, and 2 collaborators, a total of 66 persons, only about one-half of whom were under salary from the National Museum, the others, mainly employees of other Government bureaus, serving in a volunteer or honorary capacity.

Mr. W. H. Holmes, Head Curator of the Department of Anthropology, having been appointed Chief of the Bureau of American Ethnology, Prof. O. T. Mason, Curator of Ethnology, was on November 15, 1902, placed in charge of the Department as acting head curator. Dr. A. Hrdlicka, whose researches on the physical characteristics of man are widely known, was on May 1, 1903, designated as assistant curator of the newly organized Division of Physical Anthropology. Dr. G. T. Moore, of the Department of Agriculture, was appointed custodian of the section of lower algæ on May 25, and at the same time the designation of Mr. W. T. Swingle was changed to custodian of the section of higher algæ.

On December 31, 1902, Mr. Charles T. Simpson resigned his position as principal aid in the Division of Mollusks, being succeeded by

Mr. Paul Bartsch, whose place was in turn taken by Mr. William B. Marshall, appointed aid on April 1. Mr. R. G. Paine was made an aid in the Division of Reptiles and Batrachians on April 6, and Mr. T. Wayland Vaughan, Custodian of the Madreporarian Corals on June 30.

A list of the members of the Museum staff is given in Appendix I.

NECROLOGY.

It is gratifying to note that during the past year no deaths have occurred in connection with the Museum staff, though among its friends there have been several losses, only two of which will be mentioned here.

The first was that of Maj. J. W. Powell, explorer, geologist, and anthropologist, for some time director of the U. S. Geological Survey, and the founder and director of the Bureau of American Ethnology. An account of his life and work will be found in the first volume of the Smithsonian report for 1902, and it need only be recalled here that in nearly all the varied subjects of his personal studies and of his administrative oversight he was brought into close relations with the Museum, which is indebted to him for valuable collections, for wise suggestions, and for a continued interest in its welfare.

The second loss resulted from the death of Dr. James Cushing Merrill, of the United States Army, which occurred in Washington on October 27, 1902. Doctor Merrill was born in Cambridge, Massachusetts, in 1853, and after attending school in Germany, he entered the medical department of the University of Pennsylvania, from which he was graduated in 1874. About a year later he was appointed assistant surgeon in the United States Army. While stationed at various military posts in the west and southwest, he devoted much time to the study and collection of birds and eggs, generously giving away his collections, the National Museum being one of his favored beneficiaries. The accession records show that between 1875 and 1896 no less than 28 separate lots of specimens were received from him, these including a large number of valuable skins, eggs, and nests of birds, besides mammals, fishes, and other natural history material. Doctor Merrill was elected an active member of the American Ornithologists' Union at its first congress in 1883. He was a careful and accurate observer of the habits of birds and mammals, and also contributed several important papers to scientific literature. Two of these were published in the Proceedings of the National Museum, their titles being as follows: Notes on the Ornithology of Southern Texas, being a list of birds observed in the vicinity of Fort Brown, Texas, from February, 1876, to June, 1878, and On the Habits of the Rocky Mountain Goat.

REPORTS OF HEAD CURATORS.

REPORT ON THE DEPARTMENT OF ANTHROPOLOGY.....By OTIS T. MASON.
REPORT ON THE DEPARTMENT OF BIOLOGY.....By FREDERICK W. TRUE.
REPORT ON THE DEPARTMENT OF GEOLOGY.....By GEORGE P. MERRILL.

REPORT ON THE DEPARTMENT OF ANTHROPOLOGY FOR THE YEAR 1902–3.

By Otis T. Mason,
Acting Head Curator.

During the year a number of changes have taken place in the personnel of the Department of Anthropology. When Mr. W. H. Holmes, the Head Curator, was made Chief of the Bureau of American Ethnology, Prof. O. T. Mason, Curator of Ethnology, was designated as Acting Head Curator, Dr. Walter Hough, Assistant Curator, became Acting Curator of the Division of Ethnology; and Mr. Paul Beckwith, Aid in the Division of History, was temporarily assigned to the Assistant Curatorship of Ethnology. Owing to continued failing health, Mrs. Fanny Dinsmore, stenographer, was compelled to resign, and in January Mr. W. E. Wilson was selected to fill the place. In January Mr. H. W. Hendley, who had assisted the Department in preparing its exhibit for the Pan-American Exposition, was appointed preparator in the Department, and in February Dr. Ales Hrdlicka was called to the position of assistant curator in the newly established Division of Physical Anthropology.

The work of the Department during the year has consisted largely in cataloguing, caring for, and installing the collections received, although the preparation of an exhibit for the Louisiana Purchase Exposition has called for a large share of attention. This work is in charge of Mr. W. H. Holmes, who has undertaken to collect a series of exhibits illustrative of the highest artistic achievements of the American aborigines.

Until the present year the Department has been devoted entirely to the culture side of the science of man, collections illustrating the physical characters of the race, normal as well as abnormal, having been cared for in the Army Medical Museum; but a large part of this material has recently been transferred to the National Museum, and a laboratory for the study of this branch has been established under the curatorship of Dr. Ales Hrdlicka. Thus, for the first time in its history, the National Museum embraces the whole subject of anthropology, physical and cultural, so far at least as this branch can be represented and illustrated by material objects.

The collections assigned to the Department during the year number 24,319 specimens, and have been distributed among the several divisions and sections as follows:

Ethnology	4,547
Historic archeology	20
Prehistoric archeology	16,181
History and biography	1,502
Physical anthropology	99
Ceramics	146
Historic religions	92
Medicine	7
Graphic arts	1,502
Mechanical technology	149
Photography	9
Music	65
Total	24,319

These collections are classed as gifts, purchases, transfers, deposits, exchanges, and loans.

GIFTS.

Among the numerous gifts received in the Department during the year the following may be especially mentioned:

1. Collection of ethnological material from Sumatra and the Andaman and Nicobar islands, presented by Dr. W. L. Abbott, of Philadelphia, who is one of the most generous benefactors of the Museum. These collections number some 500 specimens, and illustrate the native arts and industries of various primitive peoples of whom little is generally known. Their value is greatly enhanced by the fact that they were obtained directly from the natives by a trained collector, and are accompanied by all essential historical and descriptive data.

2. A large collection made by the late Col. F. F. Hilder, of the Bureau of American Ethnology, in the Philippine Islands for the Pan-American Exposition, and presented to the National Museum by the Government board of the exposition. It includes upward of 1,500 specimens, and illustrates in an effective manner many of the native industries of the islands.

3. A small series of ethnological specimens collected among the Tlinkit Indians of southeastern Alaska by Lieut. G. T. Emmons, U. S. Navy. These specimens have especial value, because of the careful record of tribe, manufacture, and use furnished by the collector.

4. A series of stone implements, believed to be of paleolithic age, from the lateritic deposits near Madras, India, presented by Mr. H. W. Seton-Karr, of London, England.

5. Relics of General and Mrs. U. S. Grant, consisting in large part of objects presented to General and Mrs. Grant during their trip abroad, as follows: Cabinet presented to Mrs. Grant by the Empress

of Japan; pair of modern bronze vases from the Empress of Japan; gold toilet set from the King and Queen of Siam; lady's silver perfume case from the Maharaja of Dekkan; poems of Japanese authors; ball dress and slippers worn by Mrs. Grant at President Grant's second inauguration ball; lacquered bamboo case, gold-embossed, said to be one thousand years old, and valued at many thousand dollars, from the King and Queen of Siam; death mask of General Grant; riding boots worn by General Grant at Appomattox, Virginia; velvet belt worn by General Grant; saddle valise; two commissions; five addresses to General Grant received when abroad; five certificates to General Grant; menu cards, etc. Presented by the children of General and Mrs. Grant, through General Frederick D. Grant, U. S. Army.

6. Sword and shoulder straps worn by Gen. Frederick D. Grant, U. S. Army, during the war with Spain, while participating in the campaigns in Porto Rico and the Philippine Islands and in the Peking Relief Expedition; presented by Gen. Frederick D. Grant, U. S. Army.

7. Painting, "The March of Time," from the artist, Mr. Henry Sandham, London, England.

8. Plaster bust of George Washington, made from a life mask taken by Jean Antoine Houdon at Mount Vernon in 1785; from Miss Elizabeth Bryant Johnston.

9. Bronze bust of Hon. Horatio King; from his son, Mr. Horatio C. King.

10. Cane of Horace Greeley; from Mr. H. S. Manning.

11. Costume worn by Prof. S. F. B. Morse when at the courts of Europe; from his heirs, through Mrs. Franz Rummel.

12. Relics of Governor William Shannon, of Ohio and of Kansas; from Mrs. Osborn Shannon.

13. Six pieces of American made porcelain, decorated and presented by Mr. E. Lycett, Atlanta, Georgia.

14. Ten Graeco-Egyptian papyri, from the Egyptian Exploration Fund.

15. The Division of Physical Anthropology has been enriched by gifts of crania and parts of the human skeleton from Mr. E. W. Nelson, Dr. John Walsh, Dr. Ales Hrdlicka, Mr. Clarence B. Moore, the U. S. Fish Commission, Dr. D. S. Lamb, L. C. Harris, and the Army Medical Museum.

16. Collection of 837 pieces of gold, silver, and copper coins, from Mrs. E. M. Chapman.

17. An Austrian flint-lock pistol used in the Napoleonic wars; presented by Baron P. Paumgarten, chancellor of the Austro-Hungarian Embassy.

18. Several Morse telegraph keys of the earliest type used in this country; presented by Mr. C. M. Lewis.

19. A number of important accessions which have been in the Museum for several years as deposits have, during the year, been presented to the Institution and thus have become permanent exhibits. Among these are: Dividing engine and slide rest invented by James Ramsden, presented by the executors of his estate; Morse telegraph register and relay, loaned by Mr. Charles Heaton and now presented by Mr. Charles M. Heaton, jr.; collections of decorations conferred upon Prof. S. F. B. Morse by various foreign governments, viz: Order of the Legion of Honor of France; the Royal American Order of Isabella the Catholic of Spain; Order of the Tower and Sword, Portugal; Order of Sts. Maurice and Lazarus, Italy; Order of Nichan-Iftikhar, Turkey; medal of merit established in 1884 by King Frederick William, of Wurttemberg; medal for scientific merit established by Frederick William IV of Prussia, set in the lid of a gold snuffbox; presented by J. E. F. Morse, Mrs. Franz Rummel, W. G. Morse, S. F. B. Morse, S. M. Perry, and L. L. Morse.

PURCHASES.

The purchases in ethnology were: Thirty-nine specimens of Pueblo pottery from Col. C. A. Deane; 13 specimens of Chippewa Indian quill work from Rev. D. C. Lee; 103 specimens of basketry, masks, etc., from Lieut. G. T. Emmons, U. S. Navy; 195 specimens of Buddhist art from Dr. Carl C. Hanson; 74 specimens of mission Indian basketry from Mr. H. N. Rust.

In ceramics: Five pieces of Syrian glass from Mr. Thomas B. Clark.

In historic religious ceremonials: Twenty-eight objects from North Africa illustrating Jewish religious ceremonials, from Mr. Ephraim Deinard.

In physical anthropology: Crania and other objects from Mr. C. A. Nelson, Mr. B. Sturtz, Mr. N. Dumarest, Mr. Walter G. Hill, Mr. Roy W. Kelley, and Mr. W. C. Hill.

In metrology: A set of German silversmith's weights of the sixteenth century and a rare surveyor's compass of French manufacture.

TRANSFERS.

A number of valuable collections transferred to the Museum by the Bureau of American Ethnology include the following:

1. Stone implements, ornaments, pottery, etc., numbering 1,364 specimens, from the Mississippi Valley and the Pueblo region, collected by Mr. E. O. Matthews.

2. Collection made by Dr. J. Walter Fewkes in the islands of Santo Domingo and Porto Rico, including elaborately carved stone pestles, zemes or mammiform stones with sculptured devices, a stone hatchet with human figure carved in low relief, stone hatchets with handle and blade in a single piece, stone "collars," amulets, polishing stones,

stone balls, pottery, a "regurgitating" or swallowing bone made from the rib of a manatee and finely carved with a human figure, etc. This remarkable collection comprises 1,287 specimens.

3. A series of implements and other objects collected by Mr. W. H. Holmes and Gerard Fowke from an aboriginal hematite mine at Leslie, Missouri. The mining tools include roughly grooved mauls, hammer stones, and picks of stone and hematite. There are also specimens of the ore mined and used as paint, a large mass of hematite weighing 1,600 pounds, showing marks of the ancient mining tools, and arrow points, leaf-shaped blades, and spearheads of flint.

4. An archeological collection comprising 3,058 specimens, obtained by Mr. Frank K. Cushing, from the shell heaps on Campbell and Torrey Islands, Maine. It consists of stone implements, such as knives, spearheads, arrow points, scrapers, and drills; an interesting series of bone objects, among which are harpoon heads, arrow points, awls, needles, and a large number of pieces of animal bones showing marks of cutting and sawing. There are also fragments of rude pottery.

Collections of Dr. Frank Russell, of Harvard, accessions 39990 and 39991, secured by him among the Pima Indians of southern Arizona. A description of the collection will appear in a forthcoming report of the Bureau of American Ethnology. The first of these consists of 289 specimens and was received as a deposit from the Bureau of Ethnology; the latter consisting of 44 specimens of Pima baskets, was purchased.

EXCHANGES.

1. Ethnological specimens, 41 in number, including baskets, a tobacco bag, a pipe, a woman's knife, and other Indian articles; from Lieut. G. T. Emmons, U. S. Navy.

2. Two fowling pieces and three Filipino swords; from Mr. Paul Beckwith.

3. Stone implements, from Uruguay, forwarded by the Museo Nacional of Montevideo through Señor Luis A. de Hererra, secretary of the Legation of Uruguay, in exchange for North American archeological and ethnological specimens.

LOANS.

1. One hundred and thirty-one specimens of oriental metal work, lacquer, and porcelain, including a number of examples of Buddhist and Hindu religious art; by Miss Eliza Ruhama Seidmore.

2. Forty-seven objects of Buddhist religious art; by S. S. Howland.

3. Relics of Gen. Alexander Macomb, senior major-general of the United States Army from 1821 to 1848, consisting of swords, uniforms, chapeaux, etc.; by Mrs. F. G. d'Hautville.

4. Derringer pistol, once the property of Henry Clay; By Mr. B. B. Perrow.

5. Collection of 26 relics of the Revolutionary period; by the Daughters of the American Revolution, through Mrs. William Lindsay, chairman of the relic committee.

6. Pewter platter, land grant, etc.; by the National Society of Colonial Dames, through Miss Virginia Miller, chairman of the relic committee.

7. Fossil skull from an ancient river terrace at Lansing, Kansas; by Mr. M. C. Long.

8. Anthropometric apparatus; by the American Museum of Natural History, New York, and the Army Medical Museum, Washington.

9. Collection of pikes and lances used by Confederates during the civil war, uniforms of the same period, guns captured in various Indian campaigns, swords and an old musket from the ship *Somerset*, war of 1812; by the War Department.

10. A series of six models of United States war vessels, deposited by the Navy Department, is of special interest. The vessels represented are the cruiser *Baltimore*, gunboats *Yorktown*, *Petrel*, and *Bancroft;* double-turreted monitors *Miantonomoh* and *Monterey;* ram *Katahdin;* and dynamite gunboat *Vesuvius*.

11. Models of cannon and howitzers used in the United States Army between 1845 and 1865, and a large collection of rifles, muskets, and other small arms; by the War Department.

12. Samoan outrigger canoe, by Mrs. J. L. Jayne.

13. Daguerreotype of Mrs. Dolly Payne Madison, wife of President Madison, by Mrs. C. S. Brooks.

CARE OF THE COLLECTIONS.

The numerous accessions of the year, especially the large collections of Abbott, Hilder, and others, have made it necessary to contract the exhibition space in order to make room for the ever-growing study series and for laboratory purposes. The demands of the Louisiana Purchase Exposition and of the newly-established Division of Physical Anthropology for space have increased the embarrassment. The congestion has been somewhat relieved by fitting up the galleries over the south-west and west-north ranges, but overcrowding is still everywhere apparent.

The usual watchfulness over the ethnological collections to protect them from insects and rust has been exercised, and Mr. Joseph Palmer has devoted a large part of his time to the work of overhauling, renovating and poisoning.

Until additional exhibition space is provided the installation of new material is practically at an end, excepting where exhibits that have been long before the public are replaced by others of greater interest.

The work of labeling the exhibits has been carried forward with all possible energy during the year, and great advance has been made over previous years, especially in the labeling of the larger units, such as halls, alcoves, groups of exhibits, and cases.

In the Division of Ethnology the Philippine collection has been temporarily arranged in cases in the north-west court gallery; the collections obtained through the Museum-Gates expedition in Arizona during the previous year have been placed in good order in the storage series of the Pueblo court, and Mr. Thomas W. Sweeny has classified and rearranged the large Eskimo study collection in the storage bases of the north-west range. Mr. Joseph Palmer and Mr. Charles Luscombe have been engaged in mending, modeling, making facsimilies of specimens, and allied laboratory work.

During the entire fiscal year the hall of prehistoric archeology has been closed on account of repairs, but the work of cataloguing and caring for the collections has gone on without interruption under the supervision of Mr. E. P. Upham.

A large collection of Washington relics, transferred to the Museum from the Patent Office, has been installed in the hall of American history in connection with cognate exhibits, under the supervision of Mr. A. H. Clark and Mr. Paul Beckwith. The exhibition series in this division is all labeled and the crowded condition of the study series has been greatly relieved by removing portions of it to the new galleries. It has long been felt that a suitable catalogue of the historical collections should be prepared for publication by the Museum, and during the year this work was initiated by the employment of Miss Elizabeth Bryant Johnston, who has completed a descriptive catalogue of the personal relics of George Washington.

In the Division of Physical Anthropology there is as yet no exhibition series, the time of the new curator, Doctor Hrdlicka, having been devoted to organizing the division and fitting up a laboratory of anthropometry.

In the sections of historic religious ceremonials and classical archeology, few changes have been made save that the labeling has been carried practically to completion.

In the Division of Medicine the curator has been engaged in preparing a card catalogue of the collections. Each specimen, whether on exhibition, in the study series or in storage, has an individual card, giving name, number, collector, mode of acquisition, etc.

EXPLORATIONS.

During the year a very limited amount of field work has been undertaken by members of the Department's staff. Mr. W. H. Holmes continued his explorations in archeology on behalf of the Bureau of Ethnology. Under his direction numerous mound relics and fossil

bones of ancient mammals were obtained near Kimmswick, Missouri, by Mr. Gerard Fowke, and extensive collections were made in ancient flint quarries and workshops in Carter County, Kentucky, and in Harrison County, Indiana, illustrating all the phases of flint working.

Mr. Holmes, aided by Mr. Fowke, made investigations in a hematite mine at Leslie, Missouri, obtaining the collections referred to on a preceding page.

Dr. J. Walter Fewkes, of the Bureau of Ethnology, concluded important explorations in the islands of Santo Domingo and Porto Rico. It has long been known that the latter island was in some way a sacred retreat of the ancient inhabitants of the Antilles. Many years ago a large collection of objects of stone was presented to the Museum by George Latimer, and Doctor Fewkes was successful in supplementing this with valuable material, adding many new forms. In addition to his archeological explorations, Doctor Fewkes made careful studies of the natives, including the whites, blacks, and remnants of ancient aborigines.

Dr. W. L. Abbott, of Philadelphia, has continued his explorations in the northern portion of the island of Sumatra and the small islands adjoining, and the mainland in the Straits Settlements, contributing the valuable collections already described.

RESEARCHES.

One of the chief aims of the Department of Anthropology has always been to favor and encourage research, not only on the part of members of the staff but of investigators elsewhere. Much attention has been paid during the year to correspondence on every topic connected with anthropology, and to obtain, if possible, for the friends of the Institution information that is not within their reach. Literature published by the Smithsonian Institution and the National Museum on anthropological subjects has been freely distributed. This remark applies equally to the ethnology of America, the Philippine Islands, and incidentally to other parts of the world. The curators have been almost daily importuned for information concerning the nature and use of archeological relics.

A collection of Indian shields was sent to Mr. James Mooney, Mount Scott, Oklahoma, for study in the field.

In the Division of History questions arise constantly as to the meaning of inscriptions and the readings on coins and medals. Already, in the new Division of Physical Anthropology a beginning has been made in supplying special instructions to observers and students. In the Division of Ceramics errors with reference to the age and sources of pottery are corrected. With the public, great interest is manifested in the "Synoptic Series" of the Museum, and teachers are constantly receiving instructions with reference to the development of

various lines of industrial apparatus. All the divisions of the Department of Anthropology have been active in this regard during the past year.

In December Dr. Hjalmar Stolpe, director of the Royal Museum of Sweden, Stockholm, studied Polynesian and South American collections.

Professors H. Pittier, of Costa Rica, and C. V. Hartmann, of Stockholm, received instructions in casting archeological specimens in the anthropological laboratory.

In March Dr. A. B. Hunter, of Raleigh, North Carolina, received instructions in making casts, photographs, and other methods of ethnological investigation with a view to studying the negro of the South.

Mr. Wells F. Andrews, statistician of the Immigration Bureau in the Treasury Department, made studies in the Division of Ethnology in order to classify immigrants into the United States. The scheme furnished has been adopted by the Department.

Dr. Waldemar Bogoras, of the American Museum of Natural History, New York, made a careful examination of the Eskimo collection in order to find Siberian material. His results will appear in the publications of that institution.

Mr. Theodore Roosevelt, jr., and Mr. Ernest Thompson Seton received instructions in the methods of primitive fire-making.

Dr. Carl Von den Steinen, of Berlin, made a special study of the technological processes employed by the North American Indians, especially in weaving and basketry.

Subsequent to the meeting of the Society of Americanists in New York, many of the foreign delegates visited the Museum, where a reception was held in their honor.

Dr. E. A. Bogue made an examination of the denture in the Indian crania.

The Curator of the Division of Ethnology finished his comprehensive work on American Indian basketry and Doctor Hough submitted for publication his monograph on the results of the Museum-Gates expedition to Arizona in 1901, which was printed in the Annual Report of the National Museum for that year.

Dr. A. Hrdlicka published a report on the Lansing skeleton in the American Anthropologist for June.

An address delivered by Dr. Cyrus Adler in connection with the opening of the semitic museum of Harvard University was published by that institution.

Dr. I. M. Casanowicz published four papers based mainly on the collections in the National Museum.

STORAGE.

Numerous specimens have been stored in buildings outside of the Museum, but it has been the policy of the Department not to send out of the building any specimens which can not be replaced in case of loss. As a result of this policy, the crowding of the halls has become more embarrassing. Even the offices of the curators are being used as receptacles of valued material for which there is no present place of storage.

Since the death of Dr. Thomas Wilson, Curator of the Division of Prehistoric Archeology, in 1902, Mr. Holmes has given especial attention to the interests of this division and has been faithfully assisted by Mr. E. P. Upham.

REPORT ON THE DEPARTMENT OF BIOLOGY FOR THE YEAR 1902–3.

By Frederick W. True,
Head Curator.

The principal features of the year covered by this report were the improvement of the installation of the exhibition series, brought about largely by placing the supervision of the work in the hands of a single officer, and the enlargement of the quarters for the National Herbarium. In the majority of classes the number of specimens added to the collections was less than last year; but in scientific value there was no appreciable decline. The number of zoological specimens added was not less than 70,000, of which 9,000 were vertebrates. About 35,000 botanical specimens were also received. Some important improvements were made in the installation of the great zoological study series, but the need of more space and better facilities were keenly felt. Preparations for the Louisiana Purchase Exposition, St. Louis, 1904, were actively begun, and were in an advanced condition at the close of the year.

EXHIBITION COLLECTIONS.

With the consent of the Assistant Secretary, Mr. F. A. Lucas, Curator of the Division of Comparative Anatomy, was placed in temporary charge of all exhibition work of the Department, November 1, 1902, and all the taxidermists and other natural history preparators were directed to report to him. By this change the work has been much better coordinated than hitherto, and the results obtained during the year have been very satisfactory. The curators of the several divisions are still called upon to select specimens for the exhibition series, to furnish technical information for labels, or for the use of the preparators, etc., but they are not expected to regularly supervise the work of the preparators or to install collections in the exhibition cases. There has been a growing recognition among the curators of natural history museums of the fact that the needs of the general public and of the special student and investigator are quite diverse, and that endeavors to combine in one series collections of interest to both are little better than a waste of time. The general public and the general student are only confused by a multiplicity of specimens representing small variations of one species, or illustrating small steps in a

single vital process, while the special student and investigator never has too many specimens, and can seldom make much progress with scant material.

The principal improvements during the year were in the halls devoted to mammals, marine invertebrates, insects, and fishes. The interior of the wall-cases of the South Hall gallery, containing Old World mammals, was repainted to correspond in color with the cases on the main floor and to set off the specimens properly, the color of the unpainted burlap background having proved too dull. At the same time the floor cases on the gallery containing the small mammals were refitted to correspond with those below. The result has been a great improvement in the general appearance of the cases and visibility of the collections. The very attractive group of African horse-tailed monkeys, *Colobus caudatus*, prepared some time ago with specimens presented by Dr. W. L. Abbott, was placed in a new case especially adapted for properly displaying it. The specimens were cleaned and the accessories renovated by the chief taxidermist. On the main floor, devoted to American mammals, the south wall-cases mentioned in last year's report were finished and filled with South American mammals, which are now installed in a satisfactory manner. No room has as yet been found, however, for such large forms as the tapir, pampas deer, etc. The majority of the floor-cases were furnished with new fittings, uniform in design and color. The group of Rocky Mountain sheep made originally for the World's Columbian Exposition, 1893, was taken from storage and erected at the northwest corner of the hall. The artificial rock-work was cut down and partially remodeled and the specimens renovated by the chief taxidermist. This completes the representation by groups of the principal large ruminants of North America, except that space has not been found for the White Goat group. The intention is to let this take the place of one of the two caribou groups. Numerous small mammals were added to the general North American series. A number of large mammals were mounted during the year for the St. Louis Exposition, but will not be displayed in Washington until the close of the exposition. New uniform printed labels for the entire American series of small mammals, revised and brought up to date as regards nomenclature, etc., were printed and placed with the specimens during the year. The labels for the Old World series were also revised, and, where necessary, new ones were prepared, printed, and put on the specimens. The entire mammal exhibit, therefore, with a few exceptions in some groups, is now thoroughly and satisfactorily labeled. The Indian rhinoceros, which had been on exhibition for many years, was withdrawn, as it had become unsightly through the cracking of the skin and could not be repaired satisfactorily.

In the hall in the Smithsonian building devoted to the lower invertebrates the interiors of all the wall-cases were repainted. As these

cases, for the most part, contain corals, it was decided to use black for the background as best suited to bring the specimens into relief. The corals and sponges were rearranged and some specimens added to the general North American series.

In the insect hall the exhibit of North American species was extended by the addition of representatives of the orders Lepidoptera, Euplexoptera, Orthoptera, Hemiptera, and Diptera.

After the collection of fishes exhibited at the Pan-American Exposition, Buffalo, 1901, was returned, a reclassification of all the casts was made, the series being divided into two sections—marine fishes and fresh-water fishes. The cases standing against the walls were reconstructed and furnished with large glass and paneled bases, so as to present a uniform appearance around the hall. A large shark and several other fishes of very large size were placed on top of the cases and provided with new framed labels. The descriptive labels used at Buffalo were mounted on standards of uniform design and placed beside the species to which they refer. The series now exhibited, aside from the small representation of deep-sea fishes, is entirely North American. While it is desired to exhibit various series from other parts of the world, there is not sufficient room for this purpose in the present quarters. For this reason the South American fishes preserved in formalin have been temporarily withdrawn. These preparations were in quite good condition when last examined, but they are not entirely satisfactory for exhibition on account of the bleaching of the colors, dullness of the eyes, etc. Experiments were made during the year in casting from formalin specimens. The results were quite satisfactory, and it is believed that a series of casts made in this way and painted might prove best for a permanent exhibit. A number of molds of fishes and some casts of large fishes, which have been used by the United States Commission of Fish and Fisheries in connection with various expositions, were transferred to the Museum by the Commissioner. Several of these casts were repaired and placed on exhibition, as already mentioned.

All the labels for the reptiles and batrachians were reprinted in the same style as the mammal labels, the object being to have all the faunal labels uniform as regards matter and general appearance. Instead of the particular locality in which a specimen exhibited was obtained, these labels contain a brief statement of the geographical range of the species represented, together of course with the common and scientific names, the catalogue number of the specimen, and in the case of gifts, the name of the donors. Specimens received from Government surveys are labeled with the names of the organizations which transmitted them.

Few changes of importance were made in connection with the exhibits of birds and mollusks, but copy was prepared for new labels for the entire North American series of birds. The labels had not

been printed when the year closed. The groups of birds, 16 in number, which were originally made for various expositions, were overhauled, and the cases made dust tight as far as possible and provided with new framed labels. Under present conditions it is not deemed expedient to build new cases for these groups. The beautiful specimens of the Argus pheasant presented some time ago by Dr. W. L. Abbott, were brought together by the taxidermists in the form of a group, with ground-work, and placed in a new case. This group is one of the most attractive and interesting objects in the entire exhibition series. The baseboards of all the large alcove-cases were repainted.

In order to find room for the enlargement of the National Herbarium it became necessary to abandon the limited space on the East Hall gallery previously allotted for botanical exhibits. This was done most reluctantly, but in view of the necessities of the case it was deemed unavoidable. With this change the Museum definitely abandoned making botanical exhibits for the present, but with the hope that after the new building provided for by Congress is erected, abundant room will be found for such collections.

During the year each of the exhibition halls was provided with a large sign, calling attention in a few words to its contents, as for example, "Lower Invertebrates," "American Mammals," etc. In addition, uniform framed case labels, about 200 in number, were provided for all the cases containing mammals, birds, reptiles, batrachians, insects, and lower invertebrates. The series of case labels for the exhibit of comparative anatomy was also completed.

A considerable number of requests were received during the year for photographs of various groups and single objects in the exhibition series, chiefly for purposes of publication. The Bureau of Engraving and Printing made photographs and sketches of the mounted bison as a basis for the figure of that animal placed on the new ten-dollar bill. An American eagle was mounted in a special attitude for a similar purpose. Prof. M. M. Metcalf, of the Woman's College of Baltimore, made a number of photographs of skeletons and other objects for a forthcoming work on evolution. Dr. D. G. Elliot, of the Field Columbian Museum, Chicago, obtained photographs of certain whale skulls for a work on the mammals of Central America.

EXPLORATIONS.

In the spring of 1903, Mr. F. A. Lucas, accompanied by Messrs. William Palmer and J. W. Scollick, visited one of the stations of the Cabot Steam Whaling Company, Newfoundland, to obtain a large whale for the St. Louis Exposition. Toward the close of the fiscal year Mr. Lucas reported that the skeleton and casts of the exterior of a sulphur-bottom whale, about 75 feet long, had been obtained. By invitation

of the Geographical Society of Baltimore, Messrs. B. A. Bean and J. H. Riley accompanied the expedition of the society to the Bahamas to collect aquatic and land vertebrates. By invitation of Dr. L. O. Howard, Dr. H. G. Dyar, accompanied by Mr. R. P. Currie, of the National Museum, and Mr. A. N. Caudell, of the Department of Agriculture, made an expedition to British Columbia to collect insects, and especially mosquitoes, under the auspices of the Carnegie Institution. Mr. G. S. Miller, jr., spent a few weeks in collecting small mammals in the vicinity of Hampton, Virginia. Messrs. Richmond, Ashmead, Bartsch, and Currie spent some days in Philadelphia in the study of the zoological collections of the Academy of Sciences, and Dr. Rose visited the Museum of the New York Botanical Garden. Mr. W. R. Maxon spent two months in Jamaica (April and May, 1903), where he made a very large collection of plants, and especially of ferns. He also obtained some fine examples of the large white ant nests found in the island.

ACCESSIONS.

The accessions of the year, considered as separate lots of varying sizes received from different sources, were considerably less than last year, except in the Division of Plants and the Section of Birds' Eggs. The accessions of plants were greater in number than in any year since 1895, being in all 575, but the number of specimens comprised in them was less than in the previous year, viz, about 53,500 specimens in 1902, and about 35,000 in 1903. The accessions of birds' eggs, on the contrary, aggregated more specimens than in 1902. The whole number of zoological specimens received during the year was, as already stated, about 70,000; of plants about 35,000 specimens. A notable and most important feature of the accessions was an increase in the number of types and cotypes presented, which comprise insects, fishes, birds, and crustaceans. Among the largest zoological accessions received were a collection of about 19,000 gall wasps and parasites made in Canada, and transmitted by the U. S. Department of Agriculture; about 4,000 Costa Rican insects, purchased from Mr. P. Schild, of Hamburg, Germany; about 2,000 Chilean insects, presented by Mr. E. C. Reed, of Concepcion; a collection of about 2,000 fish, birds' eggs, mollusks, and other marine invertebrates from the Hawaiian Islands, transmitted by the U. S. Fish Commission; a collection comprising about 1,500 birds' eggs, insects and mammals from Paraguay; the East Indian collections of Dr. Abbott, consisting of more than 1,200 mammals, birds, reptiles, etc. Considering the character of Dr. Abbott's collections, which contain hundreds of mammals, they should perhaps have been mentioned first, as it is obviously more difficult to assemble large numbers of these animals than of any other class. The largest collection of plants received during the year was one made by

Dr. E. A. Mearns, U. S. Army, in the Yellowstone National Park. It comprises about 5,300 specimens, and was very generously donated to the Museum by the collector. This is probably the largest scientific collection of plants ever made in the park. Next in size was the collection made by Mr. William R. Maxon, of the Museum staff, in Jamaica, comprising about 2,000 specimens, chiefly ferns.

It is a pleasure to record the continued activity of Dr. W. L. Abbott in the exploration of the East Indies. The collections received during the year were chiefly from the coast and islands of northwestern Sumatra, as far south as Siboga, and from the Riou Peninsula, just south of Singapore. They comprise, as already mentioned, mammals, birds, reptiles, and batrachians, fishes, and insects. The Sumatran mammals, about 500 in number, were studied by Mr. G. S. Miller, jr., who discovered among them a new ape (*Macacus fuscus*), four new species of mouse deer (genus *Tragulus*), nine new squirrels, a new genus and five new species of mice, and a new porcupine (*Trichys macrotis*). The birds from the same region also comprised about 500 specimens, representing 152 species, of which 19 were found by Dr. C. W. Richmond to be new to science. The collections from Pahang and the Riou Archipelago have already yielded four new species of mouse deer, and are probably as important as the preceding one for the light they will throw on the distribution of Malayan species. The National Museum has received from Dr. Abbott, since the beginning of his explorations in the East Indies, no less than 2,500 mammals, 3,900 birds, 800 reptiles and batrachians, besides very numerous specimens of other classes.

In 1902 the U. S. Fish Commission steamer *Albatross* was sent to the Hawaiian Islands for the purpose of continuing the investigation of the fisheries. In the course of this work large collections were made in various branches of natural history and transmitted to the Museum. Those received during the year covered by this report were a valuable collection of birds' eggs, about 1,500 marine mollusks in alcohol, many new to the Government collections, and about 100 species apparently undescribed; a collection of corals, and a second lot of crustaceans. The Commission also transmitted a collection of 85 birds, mainly from Laysan Island, north of Hawaii, including the type of a tern, *Procelsterna saxatilis* Fisher. From the *Albatross* Samoan Expedition of 1902 were received corals and crustaceans in addition to the specimens transmitted last year. The Commission also furnished about 800 specimens of the commoner species of marine invertebrates of Woods Hole, Massachusetts, for distribution to educational establishments, together with a small collection of fishes from the same locality, a specimen of the Tile fish (*Lopholatilus*), from 70 miles off Nomans Land, the type and cotype of a new species of white-fish (*Coregonus stanleyi*), from Aroostook County, Maine, and a cotype of a new fish (*Hadropterus evermanni*), from Tippecanoe Lake, Indiana.

Prof. T. D. A. Cockerell, of East Las Vegas, New Mexico, presented eight lots of insects of different orders, containing many new species, and including types and cotypes of species described by him; also three lots of amphipod crustaceans and leeches, the former representing a new form found in a warm spring.

An interesting collection of reptiles and batrachians from northern Mexico and North Carolina was purchased from Brimley Brothers, Raleigh, North Carolina. It contained a series of a salamander (*Desmognathus quadrimaculata*), which had not been recognized since Holbrook's time. From the same source was obtained a small collection of North Carolina fishes, one of which was found to be undescribed and was named *Notropis brimleyi* by Mr. B. A. Bean; also eight specimens of the very rare skipper, *Pamphila carolina* Skinner.

Among the most important purchases of the year were the zoological collections made by Mr. William Foster in the vicinity of Sapucay, a small town near Ascuncion, Paraguay. They comprise about 800 insects, 600 birds' eggs, and 350 small mammals. The mammals were principally bats. The specimens were all carefully prepared and labeled and filled important gaps in the Government collections.

Mammals.—In addition to Dr. Abbott's East Indian mammals and those from Paraguay just mentioned, the Museum received several other accessions which deserve mention. Dr. E. A. Mearns, U. S. Army, added to his generous donations of previous years two collections of small mammals, one from the Yellowstone Park, comprising about 300 specimens, and the other from Fort Snelling, Minnesota, comprising about 200 specimens. The collections of European small mammals, already very rich, was increased by two collections, one from Switzerland and one from Norway. An excellent series of Japanese rodents and bats, purchased during the year, represents the first well-prepared collection of mammals received by the Museum from that country. Mr. B. S. Rairden, United States Consul at Batavia, Java, obtained for the Museum two specimens of a Javan mouse-deer, which proved to be an undescribed species of much interest, and was named *Tragulus focalinus* by Mr. G. S. Miller, jr. A somewhat imperfect but very valuable skeleton of a peculiar porpoise from the Hawaiian Islands was presented by Prof. Charles H. Gilbert of the Stanford University. It represents the species *Pseudorca crassidens*, a form intermediate between the killers and blackfish, which has not been obtained hitherto from the vicinity of the Hawaiian Islands.

Birds.—Mr. Homer Davenport, of Morris Plains, New Jersey, presented to the Museum during the year 22 large and valuable birds from his extensive aviary, among which were an Australian Goose, a Javan Jungle-fowl, a Black-winged Peacock, *Pavo nigripennis*, regarded by some zoologists as a distinct species, and several beautiful pheasants, including Diard's Fire-back Pheasant, *Lophura diardi*. From

Mr. A. Boucard were purchased two rare birds of paradise, *Paradisea guilielmi* and *Rhipidornis guilielmi-III.* A pair of rare flightless cormorants from the Galapagos Islands, and about 300 birds from this group and the islands off the west coast of Mexico, including a series of *Nesomimus trifasciatus*, were also purchased. The Bishop Museum, Honolulu, presented a collection of the birds of Guam, composing about 44 specimens, representing species not previously contained in the Government collection. Mr. Outram Bangs, of Boston, presented about 50 desirable Honduras birds, and about 300 specimens from Chiriqui, Costa Rica, were obtained from him in exchange. The Biological Survey, U. S. Department of Agriculture, transmitted a fine collection of birds' eggs from different parts of North America.

Reptiles and batrachians.—Messrs. Brimley and Sherman presented a fine series of salamanders from North Carolina, and Mr. E. J. Brown a number of rare reptiles from southern Florida. In a small collection from Cocos Island, Costa Rica, presented by Prof. P. Biolley, were five specimens of a new gecko, described by Doctor Stejneger under the name of *Sphærodactylus pacificus.*

Fishes.—The accessions of fishes were remarkable on account of the number of type specimens and cotypes included among them. An especially important accession consisted of 42 types of species of Hawaiian fishes, collected in 1889 and described by Dr. O. P. Jenkins, of Stanford University. These were donated to the Museum by Doctor Jenkins, and are a continuation of the series presented in 1901. A collection of Japanese fishes, comprising 75 species, of which 3 were represented by types and 16 by cotypes, was presented by Stanford University. They were collected by President D. S. Jordan, by the University of Tokyo, and by K. Otaki. Included with them were the types of *Bryostemma tarsodes* and *Bryolophus lysimus*, two species obtained near Unalaska Island by the *Albatross.* The types of the Japanese species *Draconetta xenica* and *Cyttopsis itea* were also received during the year.

Among single specimens of interest should be mentioned a very large pipe-fish, *Fistularia tabaccaria*, 4½ feet long, from Campeche Bank, Mexico, presented by E. E. Saunders & Co. Dr. S. Wier Mitchell presented a large salmon weighing 47 pounds, taken by him at Cascapedia, Quebec. Casts of this fine fish and of the pipe-fish were made for the exhibition series. A deep-sea pelican-fish, genus *Gastrostomus*, was received during the year from the U. S. S. *Nero.* It was obtained during the survey for the trans-Pacific cable at a depth of between 2,000 and 3,000 fathoms. Mr. Louis Mobray, of Bermuda, obtained a living specimen of the large Conger eel, *Chaunomuræna rittata*, and sent it to the New York Aquarium. Upon its death, which occurred in a few months, it was sent to the Museum by the director of the aquarium, at the suggestion of Prof. C. L. Bristol. Dr. J. C. Thomp-

son, U. S. Navy, presented a small but interesting collection of fishes from the Dry Tortugas, Florida. The accessions from the U. S. Fish Commission and from Mr. H. H. Brimley have been already mentioned. (See pp. 65 and 67.)

Mollusks.—In addition to the collections of the U. S. Fish Commission, already referred to, mention should be made of the donations of two constant contributors to the Museum, Mrs. T. S. Oldroyd and Rev. H. Loomis. Mrs. Oldroyd presented about 150 marine shells from California in exceptionally fine condition, and Mr. Loomis's specimens of about 50 species from Japan and the Loochoo Islands included many desiderata. California shells were also presented by Mr. F. A. Woodworth, of San Francisco, and Hawaiian land shells by Mr. H. W. Henshaw, of Hilo, Hawaii. A second consignment of land and fresh-water shells from central Asia was received from the Imperial Academy of Sciences, St. Petersburg, Russia. Among single specimens of special value should be mentioned a fine *Voluta mamilla*, a large and very rare shell from Tasmania. A collection of Australian land and fresh-water shells, comprising species not previously represented in the Museum, was purchased.

Insects.—The three largest accessions of insects—the U. S. Department of Agriculture collection from Canada (18,947 specimens), the Costa Rican collection purchased of P. Schild (4,000 specimens), and the collection from Chili presented by Mr. E. C. Reed (2,021 specimens)—have already been mentioned. Many of the remaining accessions, 254 in number, contain material of great interest and value, but it is obviously impossible to refer in detail to more than a few of them in this report. (For a complete list see Appendix II.) One of the most important was a collection of African butterflies received in exchange from the Royal Natural History Museum, Stockholm, which included examples of many species described by Doctor Aurivillius. Another important exchange was effected with the American Entomological Society, through which the Museum received examples of about 100 species of Mexican and Central American Hymenoptera, many of them cotypes of species described by Mr. Cresson. Prof. Charles Robertson, of Carlenville, Illinois, presented cotypes of 19 species of Hymenoptera described by him. A similar collection of Coleoptera, presented by Prof. H. C. Fall, of Pasadena, California, contained 34 cotypes of his species. A collection of mites, containing types and cotypes, was presented by Prof. Robert H. Wolcott, of the University of Nebraska.

Lower invertebrates.—The accessions of lower invertebrates, like those of fishes, are noteworthy on account of the number of types and cotypes included among them. The collections transmitted by the U. S. Fish Commission have been already mentioned. From the Muséum d'Histoire Naturelle, Paris, France, was received a valuable

exchange comprising about 50 species of fresh-water crabs, nearly all of which were previously unrepresented in the Government collection. Many of the specimens were cotypes. The Stanford University presented a series of desirable specimens of Japanese crustaceans collected by Doctor Jordan and Mr. J. O. Snyder in 1900. It included several species previously undescribed. A small but interesting collection of crustaceans from the Maldive Islands, including several cotypes, was received in exchange from the Museum of Comparative Zoology. They were collected by Doctor Agassiz and party in 1901–2. Dr. S. J. Holmes, of the University of Michigan, presented 14 lots of New England amphipod crustaceans, among which were types of several species. Two smaller lots, with representations of other orders of crustaceans from Costa Rica and Cocos Island, were presented by the Museo Nacional, of San José, Costa Rica. Among them were types of species of amphipods described by T. R. R. Stebbings. Four lots of isopod crustaceans, including types, were presented by the Harriman Alaskan expedition. Dr. C. H. Eigenmann, of the Indiana State University, presented specimens of 4 species of crustaceans from Cuba, including types of 3 species.

A valuable collection of European parasites, comprising trematodes, cestodes, and nematodes, was received by the Bureau of Animal Industry, U. S. Department of Agriculture, and catalogued in the section of helminthological collections, National Museum. The Museum received a collection of parasites of fishes from Prof. Edwin Linton, of Washington, Pennsylvania. The study collection of parasites is considered the finest scientific collection of the kind now existing in the United States.

Plants.—The total number of accessions to the National Herbarium during the year was 595, a number which has not been reached for the last eight years. Of this number, 120 accessions, comprising about 5,000 specimens, were received through the U. S. Department of Agriculture.

Doctor Mearns's large collection from the Yellowstone National Park, which constituted the most extensive accession of the year, has already been mentioned. Probably next in interest is the collection made by Mr. W. R. Maxon, of the Museum staff, in Jamaica, which comprised about 2,000 specimens, chiefly ferns. Two important collections from the Philippine Islands, comprising about 1,400 specimens, were received in exchange from the Insular Bureau of Agriculture, Manila. These are believed to be the first collections from the islands made by American botanists. Another collection of Philippine plants, comprising about 1,000 specimens, was received from the Royal Botanical Gardens, Kew, England, in continuation of an exchange with that institution. Capt. J. Donnell Smith has continued his valuable donations of West Indian and Central American plants. He presented during the year a sixth series, consisting of 375 specimens.

Purchases of plants to the amount of $1,000 were made during the year. The most important items were continuations of the California collections of Mr. A. A. Heller (1,055 specimens) and the Nevada collection of Prof. C. F. Baker (481 specimens). Other purchases were as follows: Plants in the United States (3,223 specimens), viz. Maine (639), California and Arizona (989), Georgia (497), Ohio (405), Mississippi (693); plants from Central and South America, viz. Mexico (296), Costa Rica (452), Venezuela (256).

Of the plants transmitted by the U. S. Department of Agriculture during the year, the most important are the collections of Messrs. F. A. Walpole and W. W. Gorman from Alaska (1,323 specimens) and those of Messrs. F. V. Coville, V. K. Chesnut, David Griffiths, and others, from Washington, Oregon, and California (1,368 specimens).

WORK ON THE STUDY SERIES.

In the Division of Mammals about 3,000 skulls of small species were cleaned during the year, two-thirds of which were those belonging to specimens in the collection of the Biological Survey, U. S. Department of Agriculture. All the large skulls of the regular Museum series, with the exception of about 100, have been cleaned, but about 1,500 small skulls still need cleaning. Little could be done toward continuing the rearrangement of the skins of small species for lack of room and cases, but the work of making over skins which were deteriorating on account of faulty preparation progressed satisfactorily, about 400 skins having been renovated during the year. It is a cause of much regret that nothing could be done toward improving the condition of the large skins in vats and in the cases of the upper laboratory, many of which are in imminent danger of destruction. There are known to be from 1,000 to 1,500 of the size of a wolf and upward which need attention. Some of these are large antelopes and other important mammals which are now difficult to obtain. The collection of mammals in alcohol was thoroughly overhauled, and is in an excellent condition as regards both preservation and arrangement. The large storage case behind the wall case in the South Hall, used for the storage of mammal skulls, was roofed over to exclude dust, and provided with shelving. It is intended to fit the alcoves with standard racks and drawers next year for the better installation of the valuable series of skulls kept there.

The laboratories of the Division of Birds are much overcrowded, and many devices have to be resorted to in order to accommodate the collections. It has been found necessary to place different parts of the collections in rooms widely separated, which greatly increases the difficulties of administration. Some little improvement was made in the arrangement of the collection of large birds in the west basement, but progress was slow on account of insufficient help and space. It is

a satisfaction to report that the Passerine birds, which are the ones most consulted, are at present well arranged and entirely accessible. About half the study collection, comprising, perhaps, 65,000 specimens, is without standard Museum labels, and many of the water birds need new labels. Some progress in replacing worn out labels was made during the year.

The condition of the collection of birds' eggs is very satisfactory. For a collection of such great size the proportion of perfect specimens is remarkably large. Considerable progress was made in the rearrangement of both eggs and nests, but more new cases will be required before it can be completed.

The curator of the Division of Reptiles and Batrachians was without assistants this year until April, and progress in the rearrangement of the study series was necessarily slow. A considerable advance has been made, however, and the collection is now in good condition and its accessibility increased.

In the Division of Fishes, the principal operation was the preparation of a series of 50 sets of specimens for distribution to educational institutions. These sets average about sixty species each, making a total of some 3,250 individual specimens in all. Until the staff of this division is increased, little can be done beyond keeping the collection from deteriorating.

The study series of mollusks is all in fairly good condition and is accessible, so that any specimens wanted can be brought to hand in a few moments. The collection of Naiades was put in perfect order, and the cataloguing and numbering of the boxes of duplicates brought up to date. The remainder of the Jeffreys collection of shells is now most in need of attention. On account of the intricacies of the case the work can not be done rapidly. As in other divisions the need of more space is keenly felt.

The great systematic collection of insects of all orders, with the exception of the Rhynchota, is at present in excellent condition, well arranged, and accessible to students. The curator of the Division of Insects, Dr. L. O. Howard, reports as follows on the work of the division:

The insect collections are in excellent condition, increasing rapidly in the different orders, and all being rearranged in the standard insect drawers, in systematic order. It is believed, if the same liberality is continued in supplying us with these standard insect drawers as last year, that the valuable collections in the different orders will be soon safely secured and permanently rearranged.

The Lepidoptera are now all arranged in these drawers and this order is in excellent shape. This work has been done almost entirely by Doctor Dyar, who deserves great credit, not only for making many additions to the collection through his friends and correspondents, but also for putting the collection in such admirable order.

Mr. E. A. Schwarz still continues the rearrangement of the beetles, and during the past few months has rearranged several families down to the Lampyridæ. It will, however, be a long time before this large order can be rearranged, and Mr. Schwarz

will require many more drawers before his task is completed. In a few days he will begin arranging the material from the Philippines, West Indies, and South America.

Dr. Ashmead is almost continuously at work on the Hymenoptera, and has rearranged the Chalcidoidea and part of the Cynipoidea. If room No. 3, now occupied by him, is fitted up with racks to contain standard insect drawers he could, the coming year, rearrange this whole order in these drawers. He considers it important that this be done immediately to more securely conserve the many hundreds of valuable types and cotypes represented in the collection.

The Schmidt boxes, in which many types are still kept, he considers unsafe for keeping valuable types. Hundreds of types and cotypes are now being sent to us from all over the world and proper facilities must be provided for the present preservation of all types intrusted to the Museum.

Mr. Currie still continues his work on the Neuropteroid insects and has made some important additions to the orders Odonata, Neuroptera, and Trichoptera.

The Orthoptera have been removed to Dr. Dyar's room and have been rearranged into the standard insect drawers by Mr. Caudell, who has done much work on these insects, made large additions of specimens, and is substantially in charge of the order.

Mr. Coquillett also continues his work on the Diptera with indefatigable industry and has worked up, named, and rearranged several families. The additions to the family Culicidæ, or the mosquitoes, are especially large and noteworthy.

Very little work is being done in the other orders of insects not mentioned, although Mr. Heidemann finds time to do something occasionally with the Rhynchota.

Our collection of Rhynchota, or bugs (Hemiptera and Homoptera), is large and valuable, and should be placed immediately in charge of a competent specialist.

In the Division of Marine Invertebrates a special cataloguer was employed for four months to bring up the cataloguing of the crustaceans, holothurians, etc., which had fallen behind on account of lack of sufficient clerical assistance. One hundred new sets of duplicate invertebrates were prepared for distribution to accademical establishments. Some small sets were also prepared to meet special demands. The extensive collections in alcohol were thoroughly overhauled, the bottles replenished and new labels added where necessary. This important part of the zoological collections is now in good condition. Additional shelving was provided for the collection of anomuran crustaceans and worms in the rooms assigned in the north tower of the Smithsonian building. The Museum benefited by the gratuitous services of Mr. T. W. Vaughan, of the U. S. Geological Survey, who rearranged the collection of corals so as to make room for the reception of recent additions.

The scope of the Section of Helminthological Collections, under the custodianship of Dr. C. W. Stiles, was enlarged during the year by the introduction into the catalogues of the collections of the U. S. Public Health and Marine-Hospital Service. The collections of the Division of Zoology, Bureau of Animal Industry, U. S. Department of Agriculture, are also catalogued in this section of the Museum.

The need of enlarging the quarters for the National Herbarium was so urgent that the space allotted for an exhibition on the east hall balcony was, as already stated, added to the laboratory. One hundred and eleven new standard insect-proof cases were added during the year,

making a total of 225 now in use. About 125 additional cases will be required to complete the reinstallment of the herbarium, and it is hoped that these can be provided next year. The Honorary Curator, Mr. F. V. Coville, reports as follows regarding the work done on the collections during the year:

During the year we have added 111 standard insect-proof cases, making 255 now in use. It is hoped that some 125 new cases will be built during the coming year, which will about complete the installation of the collection. It will then be in a better condition than ever before. Very few insects are to be found in our new cases.

At the time the herbarium was actually transferred to the National Museum, July 1, 1894, we began to stamp every herbarium sheet added to the collection. It was assumed that there were then not less than 200,000 sheets in the herbarium, and the stamp therefore was set at 200,000. The number of specimens stamped and added to the herbarium since then is 220,000. Of these 17,055 have been added this year.

The work of recording the old part of the herbarium has almost ceased and specimens are only stamped in cases where they are sent away as a loan. This record extends from 1 to 27,218. In addition to this, 125,001 to 156,835 have been stamped.

It was decided at the close of the year that all the herbarium sheets hereafter printed should bear the legend "United States National Museum" as well as the impress of the numbering stamp, which bears the words "United States National Herbarium."

Blueprints of the standard herbarium cases adopted by the Museum were sent by request to the chief of the Insular Bureau of Agriculture, Manila.

At the suggestion of Dr. C. W. Stiles the matter of imperfections in the red labels used inside of receptacles containing type specimens of animals preserved in liquid was taken up by a special committee. The committee submitted a report recommending the sole use of labels printed with a permanent ink containing sulphide of mercury.

LOAN OF COLLECTIONS AND COOPERATION OF SPECIALISTS.

The loan of specimens to specialists in the United States and in foreign countries for purposes of scientific research continued during the year as usual. Only the more important transactions of this character can be noticed in this report. As explained last year, the Museum usually benefits quite as much by these transactions as the persons who obtain the use of the material, as the specimens are studied, identified, and also quite commonly labeled. The results of the investigations are sometimes published by the Museum, sometimes by the scientific organizations to which the specialists belong, and sometimes under private auspices.

In the Division of Birds, 11 loans were made, comprising 188 specimens. Mr. Frank M. Chapman, of the American Museum of Natural History, obtained the use of 68 specimens, chiefly shore larks, genus *Otocoris*. Forty-five specimens of warblers, genus *Dendroica*, were sent to Mr. Joseph Grinnell, of Palo Alto, California, to assist him

in determining the California forms of *D. aestiva*. Dr. Jonathan Dwight, jr., obtained the loan of 29 specimens of plovers (genus *Aegialitis*) for use in connection with his studies of the molting of birds. All the lots sent out, with one exception, were returned during the year. The loans of mammals were more numerous, amounting in all to 29 lots, comprising about 300 specimens. Dr. J. A. Allen obtained the use of 110 specimens of seals and other mammals for use in his work on the mammals of eastern Siberia. Forty-one specimens were sent to Mr. J. A. G. Rehn to assist him in the preparation of a report on the mammals of southern New Mexico and western Texas, and 14 bats, of the genus *Nyctinomus*, for use in identifying bats of that genus from the Bahama Islands. Dr. D. G. Elliot, of the Field Columbian Museum, borrowed 35 specimens in connection with his work on Central American mammals. Other loans were chiefly to the scientific assistants in the Biological Survey, Department of Agriculture. The majority of the material was returned during the year. The mollusks, of the family *Achatinellidæ*, loaned to the late Alpheus Hyatt, were transferred after his death to Prof. A. T. Mayer, who is engaged in completing the work left unfinished by Professor Hyatt. Of insects 9 loans were made, the most important being a collection of 626 Orthoptera and Dermaptera, which was sent to Mr. J. A. G. Rehn, of Philadelphia. Dr. Philip P. Calvert, of Philadelphia, received 285 specimens of dragon flies (Odonata), and Dr. E. P. Felt, of Albany, New York, 106 specimens of ophionid hymenoptera. The material loaned was, for the most part, still in the hands of the specialists at the close of the year. Of marine invertebrates, exclusive of mollusks, 9 loans were made, 2 of which deserve mention. Prof. H. Coutière, of the École Supérieure de Pharmacie, Paris, received the crustaceans of the family Alpheidæ collected by the Hawaiian and Samoan expeditions of the Fish Commission steamer *Albatross*, and also the general Museum collections of that family for report. All the specimens of the so-called *Holothuria atra* were sent to Prof. Charles L. Edwards, of Trinity College, in connection with his studies of variation. The stomatopod crustaceans, collected by the staff of the steamer *Albatross* in Hawaii and Samoa, were sent to Dr. R. P. Bigelow, of the Massachusetts Institute of Technology, who volunteered to report on them. Three lots of ostracoda were sent to Mr. R. W. Sharpe, of Wilmette, Illinois, who has undertaken to report on this group for the Museum.

A number of skulls of mammals were sent to Dr. J. M. Ingersoll, of New York, who is engaged in a comparative study of the sinuses of the nose. Plants were loaned during the year, chiefly to the botanists of the Ames Botanical Laboratory, North Easton, Massachusetts, the Biltmore Herbarium, the Gray Herbarium, Harvard University, the New York Botanical Garden, and to Dr. C. E. Waters, Mr. Karl W. Wiegand, and Mrs. Caroline W. Harris.

DISTRIBUTION OF DUPLICATES.

As already stated, 100 new sets of marine invertebrates from the duplicate collections, were made up during the year, for distribution to educational establishments, in accordance with the long-standing practice of the Museum. Each set contained about 200 specimens, representing from 92 to 99 species, making in all about 20,000 specimens. During the year 50 of these sets were distributed. About one-half of them were sent to high schools and other public schools throughout the United States, and the remainder to various universities, colleges, normal schools, public libraries, seminaries, academies, training schools, and science clubs.

About 50 sets of fishes were also made up for distribution.

A series of 60 skins of monkeys, and some other mammals which were without data as regards localities, etc., and hence of no especial value in the study collection of the Division of Mammals, were distributed to four colleges, which signified their desire to make use of the material in teaching.

LABORATORY USE OF COLLECTIONS BY INVESTIGATORS.

The collections of mammals, birds, insects and plants were frequently consulted by the naturalists of the U. S. Department of Agriculture, as in previous years. Mrs. Vernon Bailey pursued studies of birds in connection with her book on birds of the Western United States. Mr. Outram Bangs, of Boston, examined the collections of neotropical birds, and the committee on nomenclature, of the American Ornithologists Union, examined a large amount of material for the purpose of ascertaining, as in past years, the status of newly described North American species. The series of Old World chameleons was studied by Mr. Thomas Barber, of Cambridge, Massachusetts, who has in preparation a monographic work on these reptiles. In an endeavor to establish the real status of the snake, known as *Tropidonotus erythrogaster*, Prof. H. L. Clark, of Olivet College, Michigan, made comparisons of specimens in the Museum. Comparisons of insects were made by the following entomologists: Prof. John B. Smith (Noctuidae), Dr. W. J. Holland (Moths), Dr. J. A. G. Rehn (Orthoptera), Mr. J. C. Bradley (parasitic hymenoptera and sawflies), Mr. H. H. Ballou (Specidae). Dr. Walter Horn, of Berlin, Germany, examined the collections of Coleoptera and identified some of the exotic material. He spoke highly of the work of the late Martin L. Linell, who was for many years an aid in the Division of Insects.

As for some years past, Dr. N. L. Britton, director of the New York Botanical Garden, was a frequent visitor to the herbarium. During the past year he was principally interested in studying the Crassulaceae. Dr. E. L. Greene spent much time in reviewing certain of the

Papaveraceae, and Mr. Theodor Holm, the Carices. Dr. L. M. Underwood, of Columbia University, examined the collections of ferns.

Inquiries were received from Stanford University concerning the methods of cataloguing and labeling employed in the Department, and were answered as fully as circumstances would permit.

SCIENTIFIC RESEARCHES AND PUBLICATIONS.

This very important branch of the work of the Department, the foundation, indeed, and the final aim of all its other activities, was carried on with no less ardor than in previous years. The segregation of work on the exhibition series, explained in a preceding page, left the scientific staff somewhat more time in which to pursue investigations, while the activity of systematists in various parts of the country, involving the use of the Government collections, showed no abatement.

It is only possible in this place to mention some of the more important investigations carried on by the members of the scientific staff of the Museum. A complete list of all papers based on the Museum collections published by the staff for the year will be found in Appendix II of this volume. It is interesting to note that the articles exceed 150 in number, and appeared in about thirty different journals, including the following: Proceedings of the U. S. National Museum, Bulletin of the U. S. National Museum, Proceedings of the Biological Society of Washington, Proceedings of the Philadelphia Academy of Natural Sciences, Science Yearbook of the Carnegie Institution, The Auk, Naturen, Nautilus, American Journal of Pharmacy, Journal of Conchology, Smithsonian Report, Biographical Memoirs of the National Academy of Sciences, Canadian Entomologist, Journal of the New York Entomological Society, Psyche, Proceedings of the Entomological Society of Washington, Entomological News, Transactions of the Entomological Society, Country Life in America, Bulletin of the Museum of Comparative Zoology, Zoologischer Anzeiger, Public Health Report, Report of the Bureau of Animal Industry, U. S. Department of Agriculture, American Medicine, Bulletin of the Hygienic Laboratory, U. S. Public Health Service, Journal of Comparative Medicine, Contributions from the National Herbarium, Annals of Botany, Bulletin of the Torrey Botanical Club, Plant World, and Fern Bulletin.

The second volume of Mr. Robert Ridgway's extensive manual of North and Central American birds, containing 854 pages of text and 22 plates, was published during the year. It deals with the families of Tanagers, Troupials, Honey Creepers, and Wood Warblers (Tanagridæ, Icteridæ, Cœrebidæ, and Mniotiltidæ), comprising 77 genera and 433 species and subspecies.

The preparation of the third volume, covering 15 families, was in an advanced stage at the close of the year, about 400 pages being already

in type. Dr. Charles W. Richmond's paper on the birds collected by Doctor Abbott and Mr. C. B. Kloss in the Andaman and Nicobar Islands was published by the Museum during the year. Doctor Richmond spent considerable time in identifying the Abbott collection of birds for the west coast of Sumatra and in working up a collection from the South Pacific. He continued work on the card catalogue of the genera and species of birds. Two papers on South American birds in the Museum collection, by Mr. H. C. Oberholser, appeared during the year, and also one by Dr. W. K. Fisher on a new tern from the Hawaiian Islands. Dr. William L. Ralph continued the preparation of material for a supplementary volume on the life histories of North American birds, with special reference to their nests and eggs, to complete the important work left unfinished by the death of Major C. E. Bendire.

Dr. L. Stejneger completed his study of the reptiles of Porto Rico, and handed the manuscript in for publication in November. It is hoped that means will be found for its publication at an early date. When the year closed he was still engaged in the investigation of the herpetological fauna of eastern Asia. Papers by Doctor Stejneger on Holbrook's salamander and on the reptiles of the Huachuca Mountains, Arizona, were published by the Museum during the year.

In accordance with the arrangement made with President D. S. Jordan, the Museum published during the year 14 papers on Japanese fishes, prepared by himself and conjointly with other ichthyologists. Two papers on the osteology of fishes, by Mr. E. C. Starks, were published, and a brief paper by Dr. Theodore Gill on the use of the name "torpedo."

In connection with an extensive work on the Tertiary mollusks of Florida, Dr. W. H. Dall prepared reviews of the recent mollusks of the groups Veneridæ, Carditacea, Cyrenacea, and Astartidæ. Dr. Bartsch continued work on the Pyramidellidae, and had nearly completed the investigation at the close of the year.

The researches carried on by Mr. G. S. Miller, jr., had for their principal object the elucidation of Doctor Abbott's collections of East Indian mammals. As stated on a previous page, he found in the collection studied 17 new species of mouse deer, genus *Tragulus*, and 16 new species in other orders, together with a new genus, *Lenothrix*. In going over the Museum collection of American bats, he detected 20 undescribed species, diagnoses of which are published in the Proceedings of the Philadelphia Academy of Natural Sciences. He also prepared a number of notes on different species of bats and rodents. Dr. E. A. Mearns, U. S. Army, made a study of the ocelots in the Museum collection and in other collections, the results of which were published in September, 1902, as Proceedings paper No. 1286. Dr. M. W. Lyon, jr., completed and handed in for publication his list of

type specimens of mammals, exclusive of cetaceans, in the collections of the Museum. As photographs of the types are to be prepared, this catalogue has not yet been published. It records the presence of type specimens, or type material, of 469 species and subspecies. (This is exclusive of the type specimens in the collection of the Biological Survey, U. S. Department of Agriculture, which are probably at least as many.) Dr. Lyon has also pursued investigations relative to the osteology of the rabbits, and published two brief notes on other mammals. The Head Curator completed his comparison of North American and European species of whalebone whales, and toward the close of the year submitted a manuscript of about 1,000 pages, with 50 plates. He also prepared papers on Dr. Philippi's species of Chilean porpoises, on a killer whale stranded on the coast of Maine, and on a species of *Prodelphinus* obtained at Honolulu; and notes on the name of the common porpoise of the genus *Tursiops*, and on the occurrence of the pollack whale, *Balænoptera borealis*, in American waters.

Doctor Ashmead continued his study of the classification of the Chalcid flies, which was in course of publication by the Carnegie Museum at the close of the year, and a series of papers on the wasps of the groups Vespoidea, Proctotrypoidea, and Cynipoidea, was published in the Canadian Entomologist and other entomological journals. He continued work on his monographs of North America Braconidæ, a Philippine Hymenoptera, Japanese Hymenoptera, and also a catalogue of North American Hymenoptera. Mr. D. W. Coquillett was occupied in identifying and arranging the Diptera, and completed a revision of the genera of the family Empididæ. A paper by him describing four new genera and 94 new species of North America diptera appeared in the Museum Proceedings in September, 1902. Mr. Nathan Banks published 16 papers on spiders and on other subjects of a more general character. A paper on dragon flies, and one on ant lions, by Mr. R. P. Currie, were published by the Entomological Society of Washington during the year. Mr. Currie continued work on a catalogue of North American Neuropteroid insects, and on a monograph of the ant lions. Mr. August Busck published 2 papers on the codling moth, and one on a new species of the family Yponomentidae. His revision of the American moths of the family Gelechiidae was published by the Museum during the year. The Museum Proceedings for the year also contained a paper by Dr. H. G. Dyar on the larva of moths from Colorado, and an additional section of Dr. John B. Smith's monograph of the moths of the family Noctuidae. Dr. J. E. Benedict published descriptions of new species of Galatheidae, and completed a revision of the genus *Lepidopa*, and descriptions of other new Albuneidae. He also engaged in the study of the anomuran crabs from Japan and the Hawaiian Islands, collected by the *Albatross*, some new crabs of the family Dromidae, and some interesting annelids. Miss M. J. Rathbun

continued work on a monograph of the fresh-water crabs, based on the collections of the National Museum, the Muséum d'Histoire Naturelle, Paris, the Museum of Comparative Zoology, Harvard University, and other institutions. She also published five short papers on crustaceans during the year, one of which, describing new Hawaiian crabs, appeared in the Museum Proceedings. Dr. Harriet Richardson published descriptions of two new isopods. Two papers on crustaceans collected in and near Mammoth Cave and Nickajack Cave, by Prof. W. P. Hay, were published by the Museum.

Dr. Charles B. Wilson completed his study of the collection of North American copepod crustaceans of the family Argulidæ, the results of which were published by the Museum as Proceedings paper No. 1302. It occupies 107 pages, and includes a review of all the species of the family and a bibliography, and is accompanied by 20 plates.

Dr. C. W. Stiles, Custodian of Helminthological Collections, made an extended investigation of a parasitic disease prevalent among the people of the Southern States, which he found to be due to the attacks of a new species of hookworm, *Uncinaria americana*. He also carried on investigations regarding frequency of the occurrence of parasites in men. He published nine papers relating to parasitology during the year and three others along the same line conjointly with Dr. Albert Hassall and Mr. Charles A. Pfender; also the first three parts of an index catalogue of medical and veterinary zoology, Doctor Hassall being a coauthor. The staff of the National Herbarium was too fully occupied during the year with routine work and the rearrangement of the collections to devote a great deal of time to investigations. A third section of Doctor Rose's studies of Mexican and Central American plants was published, and a paper in joint authorship with Mr. W. B. Hemsley on the genus *Juliania*. He continued work on the Crassulaceæ of North America conjointly with Doctor Britton, and completed a preliminary paper relating to that group of plants. Mr. C. L. Pollard published a number of notes in the Plant World, and described two new violets from the United States. He also published conjointly with Mr. T. D. A. Cockerell descriptions of four new plants from new Mexico. Mr. W. R. Maxon continued studies on the Museum collection of ferns, and Mr. Edward S. Steele completed a monograph of the genus *Lacinaria*.

EXPOSITIONS.

As stated in the last report, a part of the collections displayed at the Pan-American Exposition at Buffalo, 1901, were later transferred to the Charleston Exposition, which closed May 31, 1902. The exhibit made at the latter place was returned to Washington in June.

In the meantime preparations were begun for the Louisiana Purchase Exposition, St. Louis, 1904. The schedule of exhibits for this exposition, approved by the Secretary of the Smithsonian Institution, includes the display of a series of specimens of the large game mammals of the world, the cast of an adult sulphur-bottom whale (the largest existing animal), a series of the largest and most attractive birds, such as the ostriches, pheasants, birds of paradise, etc.; large reptiles, such as the crocodiles, alligators, boas, pythons, cobras, and the like; a series of models of deep-sea fishes; a systematic series of invertebrates, arranged with the special view of illustrating modern methods of museum installation and labeling; a series of the eggs of vertebrates; a collection of butterflies. An exhibit from the National Herbarium, and some minor exhibits, will probably be decided upon later. A representation of the Children's Room, showing the methods to interest children in the study of animate nature, will also be made.

A report on the Pan-American Exposition was submitted during this year, and will be found in the Assistant Secretary's report for 1900–1901, pp. 177 to 231. The Head Curator, having been in charge of the exhibit of the Smithsonian Institution and National Museum at the Charleston Exposition, also submitted a report in that connection which will be found in the Assistant Secretary's report for 1901–2, pp. 165 and 166.

PERSONNEL.

Mr. F. A. Lucas, Curator of the Division of Comparative Anatomy, was, as already mentioned, placed in temporary charge of all exhibits of the Department of Biology, November 1, 1902.

Dr. L. Stejneger served as acting Head Curator during the month of August, 1902, and for about one week in October of that year.

Dr. G. T. Moore, of the U. S. Department of Agriculture, was appointed custodian of lower algae in the National Herbarium, May 25, 1903.

Dr. Marcus W. Lyon, jr., Aid in the Division of Mammals, was appointed chief special agent for the exhibit of the Smithsonian Institution and National Museum at the Louisiana Purchase Exposition, November 1, 1902.

Mr. Charles W. Simpson, Aid in the Division of Mollusks, resigned December 31, 1902.

Mr. R. G. Paine was appointed Aid in the Division of Reptiles and Batrachians, July 1, 1902.

Mr. W. B. Marshall was appointed Aid in the Division of Mollusks, April 1, 1903.

Mr. W. V. Warner was appointed preparator January 17, 1903, and was assigned to work on the permanent exhibit of insects.

Mr. W. E. Scollick was appointed preparator in the Division of Mammals, May 14, 1903, and was assigned to the work of cleaning skulls of small mammals.

Mrs. R. E. Earll, assistant in the National Herbarium, was given leave of absence without pay from July 1 to October 1, 1902.

Miss L. V. Schaeffer, preparator in the same division, was transferred to the library, July 1, 1902.

Miss J. Harvie served as a volunteer assistant in the Division of Marine Invertebrates for about nine months.

REPORT ON THE DEPARTMENT OF GEOLOGY FOR THE YEAR 1902–3.

By George P. Merrill,
Head Curator.

The year that has just closed compares very favorably with those immediately preceding, both as to the number and value of the accessions. The Department is to be particularly congratulated on acquiring the Rominger and Sherwood collections of vertebrate and invertebrate fossils; another large portion of the Ulrich collection, and three entire meteorites from Kentucky and North Carolina, as noted below. The fine example of the Shergotty, India, meteorite, secured through the courtesy of Dr. T. H. Holland, and a fragment of the celebrated diamond-bearing meteorite from Novo Urei, Russia, are also worthy of mention.

ACCESSIONS.

The total number of accessions received by the Department is shown in tabular form below, those for 1900–1901 and 1901–2 being also given for purposes of comparison:

Divisions and sections.	1902–3.	1901–2.	1900–1901.
Geology	371	276	282
Mineralogy	110	137	149
Invertebrate paleontology	86	36	48
Vertebrate paleontology	22	65	93
Paleobotany	15	10	21
	604	524	593

As has been stated in previous reports, little idea of values can be obtained from these figures. I give below, therefore, a list of some of the more important materials received, either in the way of gift, purchase, or exchange.

DIVISION OF GEOLOGY.

1. A series of massive and cut polished stalactites and stalagmites from the Copper Queen Mine, Bisbee, Arizona, and copper ore from Nacozari, Mexico; the gift of James Douglas.

2. Two large specimens of pegmatite from Auburn, Maine; collected by the Head Curator.

3. A large series of economic materials exhibited by the U. S. Geological Survey at the Buffalo and Charleston expositions, and at the close of the latter turned over to the National Museum. It includes upwards of 400 specimens.

4. A collection of igneous rocks from Holyoke, Massachusetts, described by B. K. Emerson in a paper read before the Geological Society of America, December, 1902; the gift of B. K. Emerson.

5. A collection of volcanic bombs and lavas from Cinder Buttes, Idaho; collected by I. C. Russell.

6. One fine large specimen of native arsenic from the Double Standard Mine, Santa Cruz County, Arizona; through exchange with W. O. Crosby.

7. A collection of fluorite and associated rocks and minerals from Kentucky; made by R. S. Bassler and E. O. Ulrich.

8. A fine series of halloysite from Hart County, Kentucky; the gift of Hon. J. E. Stotsenburg.

9. A very complete series of talcs from the North Carolina Talc and Mining Company, of Swain County, North Carolina; the gift of the company.

10. Quadrangle series of rocks from the U. S. Geological Survey, as follows: Globe Copper district, Arizona; San Luis Obispo, California; Silver City, Idaho; Telluride, Colorado; Silver City and De Lamar, Idaho; Coos Bay, Port Orford, and Roseburg, Oregon; Ellensburg, Washington; La Plata, Colorado; and Crater Lake, Oregon.

DIVISION OF MINERALOGY.

1. A collection of some 200 specimens of minerals from various American localities, received from the U. S. Geological Survey at the close of the Pan-American and Charleston expositions. Conspicuous in this series are the fine tourmalinitic quartzes from Little Pipestone district, Montana, the larger being some 2 feet in length and coated on one side with a parallel growth of small, richly-colored amethysts. A second example is a crystal of smoky quartz some 18 inches in length, with good terminations, but broken across the bottom so as to show the sagenitic black tourmaline. The series also contains several cross sections of crystals, 3 or more inches in diameter, showing to good advantage the zonal arrangement of the quartz and tourmaline; also a very complete series of aurichalcites and specimens of the comparatively rare minerals coloradoite and melonite, as well as fine tourmalines from California, endlichite from New Mexico, quartz from North Carolina and New York, parisite from Montana, cinnabar from Utah and California, fluorite from New Hampshire, gothite from Colorado, melanotekite from New Mexico, barite from Colorado, graftonite from New Hampshire, etc.

2. A series of zeolites from the trap rocks of New Jersey; the gift of W. S. Disbrow.

3. A series of specimens of copper tellurides from the Good Hope mine, including the new species rickardite; the gift of Dr. L. M. Weiss.

4. A fragment from the only known specimen of footeite; the gift of Warren M. Foote, of Philadelphia.

5. Through purchase and exchange with the Foote Mineral Company, of Philadelphia, and other dealers, the following minerals, not before represented in the collections, were obtained:

Paramelaconite.	Graftonite.
Baddeleyite.	Vandiestite.
Lewisite.	Eulytite.
Derbylite.	Wittichenite.
Rammelsbergite.	Molysite.
Grünlingite.	Mazapilite.
Skutterudite.	Fuggerite.
Pentlandite.	Dundasite.
Zeophyllite.	Bavenite.
Lunebergite.	Larderellite.
Arseneopleite.	Footeite.
Pearceite.	Rickardite.
Nasonite.	Sternbergite.
Klinozoisite.	Pyropissite.
Szaibelyite.	Langbeinite.
Pinakiolite.	Penfieldite.
Edingtonite.	Leucophœnicite.
Sapphirine.	

6. Through purchase and exchange, in part for the St. Louis Exposition, the following meteorites have been added to the collection:

Locality.	Weight.	Locality.	Weight.
	Grams.		*Grams.*
Aleppo, Syria	167	Kodaikanal, India	90
Arispe, Mexico:		Majalahti, Finland	346
Cross section	9,695	Mercedita, Chile	206
Entire individual	5,261	Mooresfort, Ireland	117
Baratta, New South Wales	451	Mount Vernon, Christian County, Kentucky	[a] 159.21
Barbotan, France	273	Novo Urei, Russia	83.5
Bath Furnace, Kentucky	323	Orvinio, Italy	53
Chateau Renard, France	360	Persimmon Creek, North Carolina	4,252
Elbogen, Austria	71	Reed City, Michigan	263
Ergheo, Africa	416	Saline Township, Kansas	289
Gilgoin Station, New South Wales	290	Sao Juliao, Portugal	671
Hendersonville, North Carolina	4,479	Shergotty, India	286
Hex River, South Africa	332	Sokobanja, Servia	219
Holland's Store, Georgia	122	Tadjera, Algeria	79
Indian Valley, Virginia	569		
Jelica, Servia	16		

[a] Kilograms.

SECTION OF INVERTEBRATE PALEONTOLOGY.

1. A collection of some 1,200 species (75,000 specimens) of bryozoa and 2,500 thin sections, from the E. O. Ulrich collection.

2. The Carl Rominger collection of Mississippi Valley Paleozoic invertebrates. This consists largely of corals (many of which are figured and described in the reports of the Geological Survey of Michigan), crinoids, and mollusks, representing not less than 14,000 specimens.

3. The Andrew Sherwood collection of Pennsylvania Upper Devonic vertebrate and invertebrate fossils. This contains many choice slabs filled with large brachiopods and mollusca, besides about 3,000 small specimens.

4. Collections of trilobites with limbs (*Triarthrus becki*) studied by Doctor Walcott and described in the Proceedings of the Biological Society of Washington, 1894; of Little Metis sponges, and some twenty boxes of Paleozoic fossils, from the U. S. Geological Survey.

5. One large slab containing 18 fine specimens of melonites and some 135 labeled specimens from the Marcellus limestone; received from Dr. C. E. Beecher, of Yale University.

SECTION OF VERTEBRATE PALEONTOLOGY.

1. Casts of mandibular rami; teeth of *Mastodon humboldti* and *Mastodon cordillerum;* received from the British Museum.

2. Cast of egg of *Emeus crassus.*

3. Reptilian footprints in sandstone, from Mount Carbon, Pennsylvania.

4. A tooth (type) of *Cladodus formosus*, from Needle Mountains quadrangle, Colorado; collected by Whitman Cross.

SECTION OF PALEOBOTANY.

1. Eighty-three specimens of Paleozoic plants, from the Ulrich collection.

2. A small series of fossil plants, from the Permian of Ohio.

3. Four hundred and eighty-eight specimens of Triassic plants, from Connecticut and Massachusetts; received from the U. S. Geological Survey.

ROUTINE.

During the year under consideration the geographic exhibit of economic minerals in the southwest court has been largely overhauled and cases and specimens cleaned and rearranged. The collection of nonmetallic minerals on the balcony has likewise undergone rearrangement. The case containing the stratigraphic and historical collections, against the south wall in the west-south range, has been entirely reconstructed and the collections reinstalled. In the course of this work

some 2,500 blocks constructed on a new plan were introduced. These are made of a tripartate veneering and only about one-fourth inch in thickness.

In six floor upright exhibition cases and one wall-case, double doors have been replaced by single, thus more than doubling the size of the glass. The improvement is so great as to suggest the advisability of carrying out the work in all the cases of this type.

The collections on the west front of the Museum have been overhauled and many specimens removed to storage, whereby the appearance of the west front is considerably improved. The work has, as usual, been done under the direct supervision of Mr. Newhall.

Manuscript for about 1,300 labels has been prepared and sent to the Government Printer. Upward of 6,000 specimen and reference cards have also been prepared, and an equal number of specimens numbered.

The work of preparing the type catalogue has progressed but slowly, only about 300 slips having been written. The large influx of new and especially type material, has made it seem advisable to postpone the immediate publication of this list. This work, together with the general stenographic and clerical work of the department, has remained in the hands of Mrs. Jouy and Miss Graves.

In the section of invertebrate paleontology a large amount of work has been done in arranging the new materials, particularly those of the E. O. Ulrich collection. During the year there were identified or placed in final museum condition upward of 16,000 specimens. These are recorded in the registers, but, on account of lack of clerical help, have not been numbered, nor have cards been made for the card catalogue.

Dr. Peale reports that work on the paleobotanical series has continued along the same lines as last year. The exhibition series has been partially rearranged and new labels have been printed and exchanged for the temporary labels of the Paleozoic portion of the collection.

Work in the section of vertebrate paleontology has proceeded but slowly, owing to the small force engaged. Mr. Stewart has been at work during almost the entire year upon a mount of the *Claosaurus*. The work is now nearly completed, and it is expected that during the coming fall this very interesting vertebrate fossil will be placed on exhibition in the southeast court. The hind limb of a *Brontosaurus* has been prepared and placed on exhibition during the time under consideration.

No explorations have been carried on during the year at the expense of the Museum. Messrs. Schuchert and Bassler and the Head Curator have been in the field on various occasions, but either at their own expense or that of other organizations. Much valuable material has thus been obtained.

EXCHANGES AND LOANS.

There have been sent out from the Division of Geology during this period, to various individuals and students, some 1,262 individual specimens and 1,288 pounds of miscellaneous material—this entirely aside from such materials as are ordinarily loaned for study and investigation. For the last-named purposes there have been loaned during the year, from the Division of Geology:

To T. Nelson Dale, Pittsfield, Massachusetts, 6 specimens of roofing slates and thin sections.

To George I. Adams, U. S. Geological Survey, 9 specimens of gypsum.

To George F. Barker, University of Pennsylvania, 3 specimens of uraninite.

From the Division of Mineralogy, material has been furnished to the Chemical and Physical Department of the U. S. Geological Survey, to the Division of Roads of the Department of Agriculture, and to the Bureau of Soils of the same Department. Samples of the Putnam County, Georgia, and Admire, Kansas, meteorites were sent to Dr. E. Cohen, Greifswald, Germany, for use in his researches on meteoric iron.

From the Division of Stratigraphic Paleontology there were loaned to Dr. C. E. Beecher 43 specimens of Upper Carboniferous insects. To A. W. Grabau, Columbia University, 8 crinoids. To Dr. M. Cossmann, Paris, 16 Cretaceous gastropods. To Prof. S. W. Williston, University of Chicago, 257 specimens of Tertiary insects. To Dr. John M. Clarke, State paleontologist, Albany, New York, a large lot of Lower Silurian graptolites; and to the Royal Austrian Museum (Dr. Handlirsch), 562 Carboniferous insects.

Portions of collections in the section of vertebrate paleontology have been studied by Dr. E. C. Case, Milwaukee, Wisconsin; Prof. S. W. Williston, University of Chicago; Dr. J. B. Hatcher, Carnegie Museum, Pittsburg, Pennsylvania; Prof. H. F. Osborn, of the American Museum of Natural History in New York City; and Dr. John M. Clarke, State paleontologist of New York.

The paleobotanical collections, as usual, have been continually available to the paleobotanists of the U. S. Geological Survey. In addition, Dr. Arthur Hollick, of the New York Botanical Gardens, has on several occasions visited the Museum in connection with his work on the island series of the Upper Cretaceous.

PRESENT CONDITION OF COLLECTIONS.

It may be safely stated that, as a whole, the collections are in better condition than ever before. The improvement has been constant, and though not as rapid as one could wish, is fairly satisfactory—perhaps as satisfactory as can be expected in the present building. Naturally

there must be a constant weeding out of old material and the insertion of new in order that the collections may be kept up to date, but expansion along any lines other than that of vertebrate paleontology is practically prohibited through lack of space. The work which is now being done in connection with preparations for the Louisiana Purchase Exposition will, on the assumption that the collections return to us in safety, fill the halls to their utmost extent, and it will unquestionably be necessary to store a considerable amount of less desirable material.

Mention may be made here of the mounted skeleton of the Church, Michigan, mastodon, collected by Mr. Alban Stewart in the spring of 1901, which is now in an advanced state of preparation. This gives the Museum its first complete mounted representative of this interesting group of quadrupeds.

The acquisition for the workshops of a one-half horsepower motor with flexible shaft and fittings for drilling and cutting, and a "Jenny Lind" polisher, together with a renewal of the large grinding bed and the remodeling of the reciprocating stone saw, have greatly facilitated the work of the preparators.

The work of the year, as on previous occasions, has been complicated by preparation for an exposition.

RESEARCH.

Various influences have prevented the Head Curator from taking an active part in research in connection with the Museum collections. Numerous brief papers have been published, but as they were not, for the most part, based upon Museum materials, they need not be mentioned here.

In connection with Mr. Tassin, investigations have been made upon the meteorite collections, but the results as yet are far from ready for publication.

The Head Curator has in course of preparation a work upon the History of American Geology. This is as yet so far from complete as to need no special notice at this time.

Mr. Schuchert has continued his studies on Lower Devonic fossils, as reported last year. A report to be published by the Geological Survey of Maryland on this subject is progressing satisfactorily, and it is expected will be ready for the printer some time during the coming year.

Mr. Schuchert has also completed a study of the Cystidea of the Manlius and Coeymans formations. The paper is about ready for publication.

Mr. R. S. Bassler has in preparation studies on the Bryozoa and Ostracoda. A paper reviewing the entire Bryozoa of the Rochester shales will, it is expected, be completed during the coming winter.

Mr. Phalen has made a study of rocks collected by Messrs. Schuchert and White in Greenland in 1897.

Papers by members of the U. S. Geological Survey upon materials in the section of paleobotany are noted in the bibliography.

The personnel of the Department remains the same as last year. Mr. J. W. Coleman, skilled laborer in the section of vertebrate paleontology, who had been away on leave of absence, returned to work on September 19, 1902, but finally severed his connection with the Museum during the latter part of June.

APPENDIXES.

APPENDIX I.

The Museum Staff.

[June 30, 1903.]

S. P. Langley, Secretary of the Smithsonian Institution, Keeper Ex-officio.
Richard Rathbun, Assistant Secretary, in charge of U. S. National Museum.
W. de C. Ravenel, Administrative Assistant.

SCIENTIFIC STAFF.

Department of Anthropology:

Otis T. Mason, Acting Head Curator.

(*a*) *Division of Ethnology:* O. T. Mason, Curator; Walter Hough, Assistant Curator; J. W. Fewkes, Collaborator.

(*b*) *Division of Physical Anthropology:* A. Hrdlicka, Assistant Curator.

(*c*) *Division of Historic Archeology:* Paul Haupt, Honorary Curator; Cyrus Adler, Honorary Assistant Curator; I. M. Casanowicz, Aid.

(*d*) *Division of Prehistoric Archeology.*

(*e*) *Division of Technology (Mechanical phases):* J. E. Watkins, Curator; George C. Maynard, Assistant Curator.

Section of Electricity: George C. Maynard, Custodian.

(*f*) *Division of Graphic Arts:*

Section of Photography: T. W. Smillie, Custodian.

(*g*) *Division of Medicine:* J. M. Flint, U. S. Navy (Retired), Honorary Curator.

(*h*) *Division of Religions:*

Section of Historic Religious Ceremonials: Cyrus Adler, Custodian.

(*i*) *Division of History and Biography:*

Section of American History: A. H. Clark, Custodian; Paul Beckwith, Aid.

Department of Biology:

Frederick W. True, Head Curator.

(*a*) *Division of Mammals:* Frederick W. True, Acting Curator; G. S. Miller, jr., Assistant Curator; Marcus W. Lyon, jr., Aid.

(*b*) *Division of Birds:* Robert Ridgway, Curator; Charles W. Richmond, Assistant Curator; J. H. Riley, Aid.

Section of Birds' Eggs: William L. Ralph, Honorary Curator.

(*c*) *Division of Reptiles and Batrachians:* Leonhard Stejneger, Curator; R. G. Paine, Aid.

(*d*) *Division of Fishes:* Tarleton H. Bean, Honorary Curator; Barton A. Bean, Assistant Curator.

(*e*) *Division of Mollusks:* William H. Dall, Honorary Curator; Paul Bartsch, Aid; William B. Marshall, Aid.

(*f*) *Division of Insects:* L. O. Howard, Honorary Curator; W. H. Ashmead, Assistant Curator; R. P. Currie, Aid.

Section of Hymenoptera: W. H. Ashmead, in charge.
Section of Myriapoda: O. F. Cook, Custodian.
Section of Diptera: D. W. Coquillett, Custodian.
Section of Coleoptera: E. A. Schwarz, Custodian.
Section of Lepidoptera: Harrison G. Dyar, Custodian.
Section of Arachnida: Nathan Banks, Custodian.

DEPARTMENT OF BIOLOGY—Continued.

(*g*) *Division of Marine Invertebrates:* Richard Rathbun, Honorary Curator; J. E. Benedict, Assistant Curator; Miss M. J. Rathbun, Assistant Curator; Miss Harriet Richardson, Collaborator.

Section of Helminthological Collections: C. W. Stiles, Custodian.

(*h*) *Division of Comparative Anatomy:* Frederic A. Lucas, Curator.

(*i*) *Division of Plants* (*National Herbarium*): Frederick V. Coville, Honorary Curator; J. N. Rose, Assistant Curator; C. L. Pollard, Assistant Curator; W. R. Maxon, Aid in Cryptogamic Botany.

Section of Forestry: B. E. Fernow, Honorary Curator.

Section of Cryptogamic Collections: O. F. Cook, Honorary Assistant Curator.

Section of Higher Algæ: W. T. Swingle, Custodian.

Section of Lower Algæ: G. T. Moore, Custodian.

Section of Lower Fungi: D. G. Fairchild, Custodian.

Associates in Zoology (Honorary): Theodore N. Gill, C. Hart Merriam, R. E. C. Stearns.

DEPARTMENT OF GEOLOGY:

George P. Merrill, Head Curator.

(*a*) *Division of Physical and Chemical Geology* (*Systematic and Applied*): George P. Merrill, Curator; W. H. Newhall, Aid; W. C. Phalen, Aid.

(*b*) *Division of Mineralogy:* F. W. Clarke, Honorary Curator; Wirt Tassin, Assistant Curator; L. T. Chamberlain, Honorary Custodian of Gems and Precious Stones.

(*c*) *Division of Stratigraphic Paleontology:* Charles D. Walcott, Honorary Curator; Charles Schuchert, Assistant Curator.

Section of Vertebrate Fossils: F. A. Lucas, Acting Curator.

Section of Invetebrate Fossils: Paleozoic, Charles Schuchert, Custodian; Carboniferous, George H. Girty, Custodian; Mesozoic, T. W. Stanton, Custodian; Cenozoic, W. H. Dall, Associate Curator; Madreporarian Corals, T. Wayland Vaughan, Custodian.

Section of Paleobotany: Lester F. Ward, Associate Curator; A. C. Peale, Aid; F. H. Knowlton, Custodian of Mesozoic Plants; David White, Custodian of Paleozoic Plants.

Associate in Paleontology (Honorary): Charles A. White.

ADMINISTRATIVE STAFF.

Superintendent, J. E. Watkins.
Chief of Correspondence and Documents, R. I. Geare.
Librarian, Cyrus Adler.
Assistant Librarian, N. P. Scudder.
Disbursing Clerk, W. W. Karr.
Editor, Marcus Benjamin.
Photographer, T. W. Smillie.
Registrar, S. C. Brown.
Supervisor of Construction, J. S. Goldsmith.
Property Clerk, W. A. Knowles (Acting).

APPENDIX II.

List of Accessions, 1902–3.

Abbott, Dr. W. L., Singapore, Straits Settlements: Large and exceedingly valuable collections of natural history material from the coast and islands of northwestern Sumatra and the Riou Peninsula, south of Singapore, including several hundred mammals, birds, reptiles, and batrachians, fishes and insects, representing a large number of species, several being new to science; also very interesting collections of ethnological material from Sumatra, Andaman, and Nicobar Islands, comprising several hundred specimens illustrating the arts and industries of primitive tribes (39649, 40243); one large and two small Polynesian boats (41161).

Abert, Charles. (See under Smithsonian Institution.)

Abert, Constantia. (See under Smithsonian Institution.)

Abrams, L. P., San Diego, Cal.: Two plants from California. 41199.

Abrams, R. L., Inglewood, Cal.: Ten plants from California. 41222.

Agassiz, Dr. Alexander. (See under Museum of Comparative Zoology, Cambridge, Mass.)

Agriculture, Bureau of, Manila, P. I.: Seven hundred and sixty-eight plants from the Philippine Islands, obtained principally by the Bureau of Forestry (40645); 600 plants collected chiefly by Mr. E. D. Merrill (40646). Exchange.

Agriculture, Department of, Hon. James Wilson, Secretary: Nine hundred and twenty-four specimens of Diptera collected in Texas and Mexico by Prof. C. H. T. Townsend (39656); received through the Biological Survey, dried specimens of invertebrates from Hudson Bay, collected by Mr. E. A. Preble (40020); 50 specimens of fresh-water and marine shells from the Hudson Bay region (40028); gall insects, parasitic Hymenoptera and Diptera, representing the collection of Dr. William Brodie, Toronto, Canada (40171); received through Dr. L. O. Howard, lizard, *Cnemidophorus gularis*, from Goliad County, Texas, collected by Hon. J. D. Mitchell (40188); 2 species of land shells from Guatemala (40193); 9 specimens of land shells from Mexico, collected by Messrs. E. W. Nelson and E. A. Goldman (41080); slugs in alcohol, from Cuba, Texas, and Florida (41151); received through the Biological Survey about 30 specimens, representing 5 species of land and fresh-water shells from Mexico (40406); 6 beetles (40423).

Material deposited in the National Herbarium: Plant, collected by Mr. H. Mertens at Unalaska (39616); 4 specimens of *Ribes*, collected in New Mexico by Prof. T. D. A. Cockerell (39666); 23 specimens of *Ribes*, collected by Mr. L. Spath, Berlin, Germany (39680); plants, collected by Mr. F. A. Walpole in Alaska (39770); plant, collected by Miss Dorothy Merriam in California (39775); 2 specimens of *Cotyledon*, collected by Mrs. Blanche Trask in California (39781); plant from South America (40059); 3 plants from the District

AGRICULTURE, DEPARTMENT OF—Cont'd.

of Columbia (40082); 168 plants, collected in Alaska by Messrs. A. H. Brooks and C. G. Pringle (40100); specimen of *Amphisbæna* and specimen of *Typhlops* from Porto Rico, collected by Dr. August Busck (40116); plant from Mr. W. L. R. Lynd, Dover, New Jersey (40126); 143 plants, collected in the District of Columbia by Mr. George H. Shull (40172); 8 plants from Texas, collected by Mr. Vernon Bailey (40245); 326 plants from Oregon, collected by Mr. F. V. Coville (40246); 2 plants from California, collected by Mr. J. B. Davy (40247); 6 plants from New Mexico, collected by Mr. D. W. Caldwell (40248); 2 plants from California, collected by Dr. C. Hart Merriam (40249); 4 plants from California, collected by Mr. H. M. Hall (40250); 5 plants from Wyoming, collected by Messrs. T. A. Williams and David Griffith (40251); 214 plants from Washington, collected by Mr. J. B. Flett, of Tacoma (40268); 631 plants, collected in Alaska by Mr. M. W. Gorman (40285); 5 plants from the United States (40294); 176 plants, collected in Alaska by Mr. W. L. Poto (40302); 5 plants from Michigan and other localities (40318); 67 plants from the University of Minnesota, obtained by various collectors from different localities (40319); 130 plants, collected in Alaska by Mr. A. J. Collier (40320); about 100 plants, collected in Alaska by Mr. F. A. Walpole (40372); 2 plants from Washington, collected by Mr. J. B. Flett (40373); 34 plants from California, collected by Mr. H. M. Hall (40374); plant from California, collected by Mr. D. P. Barrows (40386); 41 plants, collected in Ontario and Washington by Mr. F. V. Coville (40387); plant from Canada, collected by Dr. J. Fletcher (40388); 3 plants, collected by Dr. C. Hart Merriam and Mr. E. A. Preble in California and British Columbia (40472); 69 plants, collected in Utah by Mr. H. D. Langille (40492); plants, collected in Oregon by Mr. F. A. Walpole (40493); 2 plants from Porto Rico, collected by Mr. C. F. Curt (40535); 9 plants from various localities (40536); 87 plants from Alaska (41540); 27 plants from Alaska (40541); 3 plants from El Paso, Texas, collected by Mr. J. H. Gant (40563); 256 plants from California, collected by Dr. V. K. Chesnut (40564); 772 plants, collected by Mr. David Griffith in Washington and Oregon (40591); 4 plants from New Mexico (40724); 2 plants from Vancouver Island (40794); 3 plants from Idaho (40795); about 200 plants, collected in Michigan by W. F. Wight in 1902 (40801); 3 plants (*Picea*) from Canada, collected by Mr. F. V. Coville (40827); 3 plants (conifers) from Arizona, collected by Mr. Coville (40828); conifers, principally from California, collected by Dr. C. Hart Merriam and Mr. Vernon Bailey (40829); 31 plants from California, collected by Mr. Vernon Bailey (40830); 3 plants from California, collected by Dr. A. K. Fisher (40831); 11 plants from California, collected by Messrs. C. Hart Merriam and Vernon Bailey (40832); 8 plants from British Columbia, collected by Mr. E. A. Preble (40833); 12 plants from Texas, collected by Mr. Vernon Bailey (40834); 24 plants from California, collected by Dr. C. Hart Merriam (40835); 32 plants from California, collected by Dr. C. Hart Merriam (40836); plant from California, collected by Mrs. M. H. Manning (40937); 95 plants, collected by Mr. F. V. Coville in the western section of the United States and Mexico (40940); 10 specimens of *Junci* from Louisiana, Utah, and Georgia, collected by Messrs. C. R. Ball, M. E. Jones, and A. H. Curtiss (40989); 9 plants from Maryland, collected by Mr. Coville (40990); 309 plants, collected in Texas, New Mexico, and California by Mr. Vernon Bailey (41027); 5 plants from Oregon and

AGRICULTURE, DEPARTMENT OF—Cont'd. Washington (41028); 82 specimens of grasses, collected in the District of Columbia by Mr. L. H. Dewey (41101); plant, collected in the District of Columbia by Mr. E. L. Morris (41163).

(See under W. J. Beal; Berlin, Germany, Botanical Museum; J. J. Crowley; E. M. Ehrhorn; H. O. Hall; R. M. Harper; John W. Harshberger; Sheldon Jackson; Minnesota, University of; Hon. J. D. Mitchell; E. N. Plank; Scientific American; J. F. Shaw; Jared G. Smith; J. A. Townsend; Mrs. Blanche Trask; F. M. Webster; F. L. Wyckoff.)

ALEXANDER, WILLIAM H., San Juan, Porto Rico: Marine shells. 40226.

ALFKEN, J. D., Städisches Museum für Natur-Volker, Handelskunde, Bremen, Germany: Two cotypes of *Agriotes cremiodes* Meyer. 39995.

ALLEN, THOMAS W., St. Joseph, Mo.: Carboniferous fossiliferous shales. Exchange. 40863.

ALLEN, WILLIAM F., Pacific Grove, Cal.: About 50 plants from California. 41168.

ALLISON, ANDREW, Bay St. Louis, Miss., and Lobdel, La.: Four specimens of Bat, *Pipistrellus subflavus*, from Georgia (39599); 10 plants (39620); 4 birds' skins (39646); toad (*Bufo tentiginosus*), from Bay St. Louis (39712); toad (39787); 33 birds' skins from Mississippi (39840); Tree frog, *Hyla gratiosa* (39872); mole (*Scalops aquaticus*), (39967); toad (*Engystoma carolinense*), (40704); bat (*Lasiurus borealis seminolus*), (40882); 2 specimens of Florida red bat, *Lasiurus borealis seminolus*, from Louisiana (41055); Spadefoot, *Scaphiopus holbrookii* (40103); snake (*Storeria dekayi*) (41157). (See also under Charles Marshall.)

AMERICAN ENTOMOLOGICAL COMPANY, Brooklyn, N. Y.: Received through Mr. George Franck, manager. Four moths (new to the Museum collection). Exchange. 41174.

AMERICAN ENTOMOLOGICAL SOCIETY, Philadelphia, Pa.: One hundred and twenty-one specimens, representing 95 species of Mexican and Cuban Ichneumonoidea. Exchange. 40805.

AMERICAN MUSEUM OF NATURAL HISTORY, New York City: Instrument for measuring skull capacity. Loan. 8411.

AMERICAN WALTHAM WATCH COMPANY, Waltham, Mass.: Received through Mr. E. A. Marsh, general superintendent. Mounted and unmounted photographs of a large model watch movement. 41128.

AMES, OAKES, North Eaton, Mass.: Seven specimens of orchids from Cuba. Exchange. 40814.

AMI, Dr. H. M., Geological Survey of Canada, Ottawa, Canada: Two specimens of *Trocholites canadensis* from Montmorency River, Quebec. 40335.

ANDERSON, C. R., Victoria, British Columbia: Plant from British Columbia. 41203.

ANDERSON, J. R., Victoria, B. C.: Plants from British Columbia. (40675; 40804).

ANDERSON, O. M., Wilmington, N. C.: Plant from North Carolina. 40138.

ANDERSON, Rev. R. W., Wando, S. C.: Oak-galls (40866); Moth (*Mamestra laudabilis* Gn.), and a Tortricid (40996).

ANDRÉ, ERNEST, Haute-Saône, France: Ten specimens of Mutillids including 4 cotypes. Exchange. 39684.

ANTRIM, Walter. (See under Pennsylvania Railroad Company.)

ARMSTRONG, C. C. (See under W. N. Clute.)

ARMY MEDICAL MUSEUM. (See under War Department.)

ARNOLD ARBORETUM, Jamaica Plain, Mass.: Twenty-eight specimens of *Crataegus* from the United States. Exchange. 41000.

ARNOLD, Ralph, Pasadena, Cal.: Specimens of Miocene ostracoda. 40792.

ASPINWALL, F. E., Atlanta, Ga.: Four plants from Georgia. 39871.

AUSTIN, W. M., McLallen Corners, Pa.: Water beetle, *Cybistes fimbriolatus* Say. 39601.

BAARDA, P. J., van, Bedford, Mass.: One hundred and twenty-five specimens of mosses from Holland. 41141.

BABCOCK, Mrs. P. H., Washington, D. C.: Basket and bundle of Georgia pine straws (40364); coiled basket of wire grass from Sorrento, Florida (40696).

BACKUS, H. H., Riverside, Cal.: Snake (*Lampropeltis multicinctus*) from California. 40187.

BACON, S. E., Erie, Pa.: Specimens of *Nymphæa*. (39623; 39739).

BAGLEY, Prof. W. S., Waterville, Me.: Specimen of *Obolus phaon* (?). 40465.

BAILEY, Gen. G. W., Waterville, Minn.: Four Chinese dolls and a portion of the tusk of a Mastodon (39619); pottery drinking cups, pottery idol, vase, and steel mirror (40042).

BAILEY, VERNON, Washington, D. C.: Fourteen specimens of *Cacti* from Texas (39833); received through the Department of Agriculture, 3 plants from New Mexico (41030). (See also under Department of Agriculture.)

BAKER, Maj. A. D., Dundee, N.Y.: Specimen of Ichneumon-fly, or "Long Sting," *Rhyssa persuasoria* Linnæus. 39970.

BAKER, C. F., Leland Stanford Junior University, Stanford University, Cal.: Two hundred and eighty-one plants from California (purchase) (39782); 82 specimens of Diptera from Ormsby, Nevada, and Santa Clara and Mateo counties, California (gift) (40308); 747 plants from Nevada and the Pacific slope, California (purchase) (40390); 6 specimens (2 species) of Hermit-crabs from Nicaragua (gift) (40928); 60 specimens (28 species) of marine, land, and fresh-water shells principally from Nicaragua (gift) (40948); specimen of *Sedum* from California (gift) (41103).

BAKER, Dr. FRANK, Superintendent, National Zoological Park: Bread bowl, stone hammer, stone hatchet, and a stone ax. 40890. (See also under

BAKER, Dr. FRANK—Continued.

Smithsonian Institution, National Zoological Park.)

BAKER, F. C. (See under Chicago Academy of Sciences.)

BAKER, L. E., Chester, Pa.: Photograph of tablet erected by the Daughters of the American Revolution, April 19, 1903, at Chester. 41194.

BAKER, WILLIAM H. (See under Postal Telegraph Cable Company.)

BALDRIDGE, Mrs. MARIA, San Pedro, Cal.; Los Angeles, Cal.: Three specimens of *Cypræa spadicea* (40436); 3 specimens (2 species) of marine mollusks from Newport Beach, near San Pedro, Cal. (40763); 3 specimens of *Murex* from California (41036).

BALDWIN-ZEIGLER POLAR EXPEDITION: Received through Mr. J. R. Champ, secretary. Miscellaneous invertebrates, mollusks, fishes, fossils, rocks, and fossil plants from Franz Josef Land. 40988.

BALÉE, Miss M. V., Shepardsville, Ky.: Flint spearhead with core of nodule. 40920.

BALL, C. R. (See under Department of Agriculture.)

BALL, G. ARTHUR, Edmonton, Alberta, Canada: Nest and 3 eggs of Canada Jay, *Perisoreus canadensis*, from northwest Canada (purchase) (39891); skin of Canada Jay (gift) (40478).

BALLAUF, D., Washington, D. C.: Model of the Jacobi electric motor. Purchase. 40789.

BANCROFT, W. J., Lowell, Mass.: Jade tablets and jade seal. Purchase. 40837.

BANG-HAAS, A. (See under A. Standinger.)

BANGS, OUTRAM, Boston, Mass.: Two hundred and ninety-four birds' skins from Central America and Colombia (exchange) (40076); 2 specimens of *Basileuterus melanotis* (40545); 52 birds' skins from Honduras (gift) (40641).

BANNERMANN GRANITE COMPANY, Chicago, Ill.: Cube of granite from a quarry at Redgranite, Waushara County, Wis. 40077.

Barber, A. W., General Land Office, Interior Department, Washington, D. C.: Hearth of fire-drill and a specimen of Indian turnip or "Tipsinna." 40328.

Barber, H. S., U. S. National Museum: Copperhead snake, *Agkistrodon contortrix*, from Plummers Island, Maryland, (39705); Red bat, *Lasiurus borealis* (39794). (See also under Rolla P. Currie.)

Bard, T. D., Chelsea, Ind. T.: Specimen of Franklin's Gull, *Larus franklini*. 40893.

Barnes, George D. (See under W. C. Barnes.)

Barnes, W. C., Decatur, Ill.: Three hundred and forty-three specimens of Lepidoptera. 40360.

Barnes, W. C. and E. M. Duncan, Sanibel, Fla.: Received through George D. Barnes. Marine shells from Sanibel Island. 40278.

Barrott, A. F., Oswego, N. Y.: Rude grooved axe, double bladed, from McGuire's wharf, Westmoreland County, Va. 40869.

Barrows, D. P. (See under Department of Agriculture.)

Bartlett, H. H., Indianapolis, Ind.: Phyllopods from Fall Creek, near Indianapolis (40932); specimen of *Natrix kirklandii* from Indiana (41071).

Bartlett, Ruth A., Kittery, Me.: Specimen of Moth (*Eudryas grata* Fabr.). 39731.

Bartsch, Paul, U. S. National Museum: Skull of black bear, *Ursus americanus*, from the Dismal Swamp, Va. 40602.

Bassler, R. S., U. S. National Museum: Fossils of the Cincinnati formation from Ohio, Indiana, and Kentucky (40227); Richmond and Clinton formation fossils from Indiana and Ohio (40228).

Bates, Dr. E. N., Boston, Mass.: Fifty-one United States musket flints (40616); flint-lock gun formerly owned by John Burns (40659).

Beal, W. J., Agricultural College, Mich.: Received through Department of Agriculture. Two hundred plants from Michigan. Exchange. 40142.

Bearden, C. E., Wylie, Tex.: Larva of a lepidopterous insect. 41106.

Beck, R. H., Berryessa, Cal. Received through Ernst Hartert, Tring Museum, Tring, England: Five birds' skeletons from Galapagos and other Pacific coast islands (40326); 327 birds' skins from the Galapagos islands and vicinity (40912). Purchase.

Beckwith, Paul, U. S. National Museum: Lithographic copy of an anniversary ode to the late President McKinley, executed by the Sisters of Mary of Baltimore, Maryland (gift) (39956); bronze official souvenir badge of the thirty-sixth annual encampment of the Grand Army of the Republic (gift) (40009); 2 single-barrel Spanish fowling pieces (exchange) (40224); collection of miscellaneous photographs (gift) (40354); 2 silver groats, Edward I of England, 1154–1179 A. D., and 2 copper coins, Ptolemeus II to Ptolemy VIII, 285–247 B. C. (gift) (40709); half maravadi of Ferd VII, 1826, Spain (gift) (40819); land document, Baltimore County, Maryland, 1744, with the seal of the Province of Maryland (gift) (40821); invitation to the dedication ceremonies of the Louisiana Purchase Exposition, April 30 and May 1, 1903; complimentary card and admittance card to grounds (gift) (40985); pistol and a revolver (purchase) (41001); silver groat of Edward 1st, King of England, 1272–1307 (gift) (41190).

Beecher, Dr. C. E. (See under Yale University Museum.)

Beede, Prof. J. W., Indiana University, Bloomington, Ind.: Five specimens of *Pleurotomaria* from the Waverly formation near Bloomington (gift) (40178); specimens of foraminiferal washings from the St. Louis formation near Harrodsburg, Indiana. Exchange. 40198.

BELDING, L., Stockton, Cal.: Nest and 3 eggs of *Wilsonia pusilla pileolata* from California (39760); 30 specimens of *Nymphæa polysepala* from Stockton, Cal. (39764).

BELL, C. C., and C. S. TAINTER, Washington, D. C.: Bronze medal. Loan. 8399.

BETZHOOVER, G. M., jr. (See under John Strother.)

BENEDICT, J. E., jr., Woodside, Md.: Forty-six specimens of *Emerita telpoida* (Say) from Asbury Park, N. J. 39878.

BENJAMIN, Mrs. MARCUS, Washington, D. C.: Three baskets. Exchange. 40163.

BENJAMIN, Dr. MARCUS, U. S. National Museum: Five samples of materials used in the manufacture of baskets (40690); badge of the American Association for the Advancement of Science, Denver, Colo., 1901 (41136).

BENSON, Capt. H. C., U. S. A., Jefferson Barracks, Mo.: One hundred and thirty-three birds' eggs from New Mexico and Arizona (40427); 14 birds' eggs from the Philippine Islands (40483).

BERGMAN, F. W., Suitland, Md.: Great Blue heron. 39724.

BERLIN, GERMANY, BOTANICAL MUSEUM: Five hundred and seventy plants from Europe and Africa (39600); received through the Department of Agriculture, 95 plants from Europe and Africa (39665). Exchange.

BERNICE PAUAHI BISHOP MUSEUM, Honolulu, Hawaiian Islands: Received through Mr. William T. Brigham, director. Forty-four birds' skins, and 4 birds' nests and eggs, from the island of Guam, collected by Mr. A. Seale. Exchange. 40537.

BIDDLE, H. B., Washington, D. C.: Digger-wasp, *Stizus speciosus* Drury. 39814.

BIEDERMAN, C. R., Florence, Ariz.: Ten specimens of Cicindelas from Harrison, Ark., and 7 specimens from Rogue River, Oregon. 40987.

BILLUPS, A., Lawrenceburg, Ind.: Fresh-water shells. 40044.

BIOLLEY, Prof. P., Instituto Fisico-Geografico de Costa Rica, San José, Costa Rica: Two species of lizards from Cocos Islands. 40400. (See also under San José, Costa Rica.)

BIOLOGICAL SOCIETY OF WASHINGTON. (See under J. H. Schuette.)

BIRD, HENRY, Rye, N. Y.: Four moths of the genus *Gortyna* and 3 larvæ. Exchange. 40348.

BITTENBENDER, HOWARD, Bloomsburg, Pa.: Spear head and 10 arrow points. 39943.

BLACKWELL, W. A., Northeast, Md.: Specimen of Hellbender, *Cryptobranchus alleghaniensis*, from the Susquehanna flats. 40135.

BLAKE, C. C., Woman's Temple, Chicago, Ill.: Two cubes of oolitic limestone; from Green River, Kentucky, and Bedford, Ind. 40173.

BLANKINSHIP, J. W., Bozeman, Mont.: Fifteen plants from Montana. 41165.

BLATCHLEY, Dr. W. S., State geologist, Indianapolis, Ind.: Specimen of "Blue racer," *Bascanion flaviventris*, from Indiana. 40780.

BÖHM, Julius, Vienna, Austria: Piece of a meteorite from Ergheo, Somaliland, Africa, 427 grams. Exchange. 40844.

BOLTON, Dr. H. C., Washington, D. C.: Specimen of dolomite from Cortina, Austrian Tyrol (40011); silver facsimile of a sealing-wax impression made by Dr. Joseph Priestley (40225); jewsharp (40679).

BONAR, Capt. R. M., assistant surgeon, U. S. A., Dosmarinos, Cavite, P. I.: Two katydids belonging to the family Locustidæ. 39924.

BOND, FRANK, Washington, D. C.: Weasel, *Putorius nigripes*, from Cheyenne, Wyo. 41014.

BOTANIC GARDENS. (See under Sydney, New South Wales, Australia.)

BOTANICAL MUSEUM. (See under Berlin, Germany.)

BOUCARD, A., Oak Hill, Spring Vale, near Ryde, Isle of Wight, England: Three birds' skins. Purchase. L. P. X. 40600.

Boule, Dr. M. (See under Paris, France, Museum of Natural History.)

Boulenger, G. A. (See under Sir George Newnes.)

Bouvier, Prof. E. L. (See under Paris, France, Museum of Natural History.)

Bowdish, B. S., New York City: Skin of *Euphonia sclateri* from Porto Rico. 40124.

Bower, John, Sr., Philadelphia, Pa.: Badge of the Farragut Association of Naval Veterans, 1861–1865. 40107.

Bowles, J. H., Tacoma, Wash.: Two nests and 5 eggs of Streaked horned lark, *Otocoris alpestris strigata*, from Washington. 40157.

Bowman, C. W., Devils Lake, N. Dak.: Golden-eye duck. 39673.

Bowman, E. L., Clarion, Pa.: Specimen of *Cermatia forceps* L. 39658.

Bowman, William A., Lloyd, Mont.: Nineteen birds' eggs from Montana. 40112.

Brace, A. C., Canandaigua, N. Y.: Myriapod representing the species *Cermatia forceps* L. 40229.

Bradford, Rear-Admiral R. B. (See under Navy Department.)

Bradford, Mrs. Sidney, Avery Island, La.: Four negatives of baskets. Loan. 8457. (Returned.)

Brainerd, Erastus, Seattle, Wash.: Silver medal struck in Germany in commemoration of the visit of Prince Henry of Prussia to the United States (40614); 8 specimens of gold from Idaho Bar, Rampart district, Alaska, and 2 specimens of gold and silver from Slate Creek, same district (40608).

Brainerd, Dr. Ezra, Middlebury College, Middlebury, Vt.: Two hundred and eight specimens of violets from Vermont (gift; exchange) (39988; 40060); 55 specimens of violets (exchange) (40078).

Brakeley, J. Turner, Hornerstown, N. J.: Living larvæ, pupæ and eggs of Culicidæ. 40213.

Branch, H. Selwyn, Roseau, Dominica, West Indies: Eight birds' skins and 5 beetles. 39651.

Brandegee, T. S., San Diego, Cal.: Forty-six plants from Lower California (gift) (40559; 40577; 40578); 326 plants from Arizona and California, collected by C. A. Purpus (purchase) (40603); 122 plants from Lower California (exchange) (40729).

Branner, Dr. J. C., Stanford University, Cal.: Two fossil crabs from Brazil. Deposit. 39624.

Braunton, Ernest, Los Angeles, Cal.: Seven hundred plants from California (purchase) (40322); 12 plants from California (gift) (40758; 40884; 41050).

Brescia, Athenæum. (See under Smithsonian Institution.)

Breton, Miss Adele, Peabody Museum, Cambridge, Mass.: Twelve obsidian flaked implements. 40300.

Brezina, Aristides, Vienna, Austria: Meteorites from Jellica, Merciditas, and San Juliao. Exchange. 40676.

Brigham, Hon. J. H. (See under Government Board, Pan-American Exposition.)

Brigham, Dr. W. T. (See under Bernice Pauahi Bishop Museum, Honolulu, Hawaiian Islands.)

Brimley, C. S., Raleigh, N. C.: Four dragon-flies (gift) (39679); 6 specimens of dragon-flies, including *Nehalemia posita* Hagen, *Anomalagrion hastatum* Say, and *Lestes rectangularis* Say (gift) (40038); 8 specimens of *Pamphila carolina* Skinner (purchase) (40871); 5 dragon-flies (gift) (40915); 11 specimens of *Odonata* (gift) (41063).

Brimley, H. H. (See under State Museum, Raleigh, N. C.)

Brimley Brothers, Raleigh, N. C.: Reptiles and batrachians from Mexico and the United States (39697; 40041). Purchase.

Brink, T. F., Nashville, Ill.: Chrysalis of butterfly (*Grapta interrogationis* Fabr.) 39631.

British Museum. (See under London, England.)

Britton, L. H., Edgewater, N. J.: Indian woven scarf. Loan. 8149.

BRIZARD, BROUSSE, Arcata, Cal.: Unmounted photographs of Indian baskets. 40486.

BRIZARD, PAUL A. (See under Phoenix Wood and Coal Company; also under "The Curio.")

BROCKETT, PAUL, Smithsonian Institution: Woodcut design of Washington Monument; life of Jefferson Davis in five tableaux, and eight campaign badges. 40627.

BRODIE, Dr. WILLIAM. (See under Department of Agriculture.)

BROOKS, A. H. (See under Department of Agriculture.)

BROOMFIELD, G. W., Mackinaw Island, Mich.: Caddis-worms of a neuropteroid insect belonging to the order Trichoptera. 41127.

BROWN, C. T., Richmond, Va.: Copper coin (Hindu-Britannic). 40666. (See also under Department of Agriculture.)

BROWN, E. J., Lemon City, Fla.: Reptiles, birds, bats, and insects from Lemon City. 40301.

BROWN, Mrs. J. CROSBY, Orange, N. J.: Nyckelhaupa (purchase) (39663); fiddle of American make (gift) (39752); bass horn, gourd mandolin, and 2 cane flutes (exchange) (41172).

BROWN, N. H., Lander, Wyo.: Specimens of Triassic fossils. 39774.

BROWN, Mrs. N. M., Ashtabula, Ohio: Three hundred and thirty-two plants collected in Mexico by E. W. Nelson and E. A. Goldman (purchase) (39718); 318 plants collected by the same persons (purchase) (39719); 248 plants from Mexico collected by Mr. Nelson (purchase) (40604); 128 plants from Mexico also obtained by Mr. Nelson (purchase) (40755).

BROWN, THOMAS, Department of Agriculture, Auckland, New Zealand: Received, through Dr. L. O. Howard, five specimens of insects. 40995.

BROWN, Rev. WILLIAM, Northbend, Wash.: Three specimens of *Lycoperdon giganteum* from Spokane County. 40003.

BROWNE, Dr. W. G., Atlanta, Ga.: Two specimens of Lubber grasshopper, *Dictyopharus reticulatus* Thunb. (39670; 39671).

BROWNLEY, E., Norfolk, Va.: Caterpillar of *Lagoa crispata* Packard. 39864.

BRUES, C. T., Zoological Laboratory, Columbia University, New York City: Thirty-seven specimens of Hymenoptera and 3 specimens of Coleoptera. 40143.

BRYAN, W. ALANSON, Bernice Pauahi Bishop Museum, Honolulu, Hawaii: Four lizards and specimens of crustaceans from Marcus Island (40394; 40737).

BRYSON, Mrs. MARY, Barton, Fla.: Pewter plate. 39795.

BUCKMAN, Mrs. M. N. (See under Smithsonian Institution, Bureau of Ethnology.)

BULKLEY, Mrs. A. L. (See under National Society of the Daughters of the American Revolution.)

BULKLEY, BARRY. (See under Citizens' Executive Committee, G. A. R. Encampment.)

BULLARD, CHARLES, Cambridge, Mass.: Thirty specimens of *Nymphæa* from Wisconsin. 39850.

BUMGARDNER, EDWARD, Lawrence, Kans.: Six botanical specimens from Kansas, including *Staphylea trifolia* L.; *Euonymus atropurpureus* Jacq.; *Rhamnus lanceolata* Pursh; *Cornus amomum* Will (?); *Amorpha fruticosa* L., and *Cornus asperifolia* Michx. 39877.

BUNNELL, J. H. & Co., New York City; received through A. J. Wise: Knox & Shain Morse telegraph registers Nos. 8032 and 8095. (40788; 40906.)

BURGESS, L. S., Washington, D. C.: Painting on shell and a cutting knife. Loan. 7826.

BURMEISTER, W. L. J., Chicago, Ill.: Digger Indian skull and some small bones. 40664.

BURR, Mrs. EBENEZER, Bridgeport, Conn.: Pomo Indian basket from Lake County, Cal.; three photographs. 40776.

Busck, August, Department of Agriculture: Forty-six specimens of *Chilomycteris* from Baracoa, Cuba. 40691. (See also under Department of Agriculture.)

Butler, Miss Faustina, Portland, Me.: Plant. 39662.

Button, F. L., Oakland, Cal.: Five specimens, 2 species, of land shells from Mexico (39778); specimen of *Nettastomella darwini* Cpr. from Bolinas, Cal. (40338).

Cahn, Lazard, New Brighton, N. Y.: Fourteen specimens of minerals. Purchase. 40957. L. P. X.

Calcutta, India, Royal Gardens: One hundred and twenty plants from India. Exchange. 39917.

Caldwell, D. W. (See under Department of Agriculture).

Caldwell, H. R., Foochow, China: Birds' eggs, insects, and coins of China. 40345.

California Academy of Sciences, San Francisco, Cal.: Plant from Nevada, collected by Prof. P. B. Kennedy (gift) (40183); 20 plants from California (exchange) (40280); 4 specimens of *Cotyledon* from Monterey, collected by Miss Alice Eastwood (exchange) (40663).

California, University of, Berkeley, Cal.: Four specimens of Cotyledons. 39854.

Callahan, J. H., Baltimore, Md.: Evans pioneer gun. Purchase. 40743.

Callier, A., Rosswein, Saxony, Germany: Two hundred and seventy-three plants from Russia. Exchange. 40647.

Calvert, Dr. P. P., Academy of Natural Sciences, Philadelphia, Pa.: Four species of dragon flies (new to the Museum collection). 40334.

Calvert, Lieut. W. J., U. S. A., Fort McHenry, Baltimore, Md.: Moro gun made in Mindanao and captured at the surrender of Manila. Loan. 7688.

Canby, W. M., Wilmington, Del.: Forty specimens of *Cratægus* from Delaware. Exchange. 40817.

Cannon, W. A., New York Botanical Garden, Bronx Park, N. Y.: Two hun-

Cannon, W. A.—Continued.
dred and thirty-five plants collected on Roan Mountain, North Carolina. (40964; 40965.) (Purchase and gift.)

Carrico, E. T., Stithton, Ky.: Five unmounted photographs taken during a storm in Stithton, 2 arrowheads, spearhead, and specimen of pottery. 40052.

Carroll, J. A., superintendent, Mescalero Indian Agency, Mescalero, N. Mex.: Mescalero Apache basket. Exchange. 40469.

Carroll, J. J., Waco, Tex.: Abnormal egg of White-necked Raven, *Corvus cryptoleucus*, from Texas (gift) (39627); 4 eggs of Mexican Jacana, *Jacana spinosa* (exchange) (39824).

Carroll, J. M., Washington, D. C.; received through W J McGee: Nails believed to have been used in the construction of the White House, and in making repairs after the partial burning of the building in 1813. 39742.

Carruth, F. H. & J. H., Lobdell, La.: Bat (*Corynorhinus macrotis*). 40787.

Carruth, G. H., Lobdell, La.: Carabid beetle, *Calosoma sayi* Dejeau. 40972.

Carter, Dr. R. K., Blue Dirge Summit, Pa.: Chrysomelid beetle, *Coptocycla guttata* Olivier. 39856.

Caste, F. L., Sandyville, W. Va.: Specimen of Walking-stick, *Diapheromera femorata* Say. 39901.

Casto, Capt. Mark, Pleasantville, N. J.: Two marine shells from New Jersey. 40534.

Cathcart, Miss E. W., Washington, D. C.: Plant from Maryland. 40315.

Cattell, G. W., Woodbury, N. J.: Specimen of wood from New Jersey. 39702.

Caudell, A. N., Department of Agriculture: Two hundred and ninety-six insects (40147); 5 insects of the family Locustidæ (40760).

Cecconi, Dr. Giacomo, Vallombrosa, Florence, Italy: Bats and reptiles. Purchase. 39771.

Chamberlain, E. B., Washington, D. C.: Two specimens of mosses from Maine. 40314.

CHAMP, J. H. (See under Baldwin-Zeigler Polar Expedition.)

CHANDLER, H. P., Lincoln School, Pasadena, Cal.: Plant from California. 40356.

CHANDLER, HORACE, Fairville, New Brunswick: Clover-mite (*Bryobia pratensis* Garman). 39889.

CHAPMAN, Mrs. C. N., Sault Ste. Marie, Mich.: Thirteen specimens of Eskimo clothing and implements from Fort Churchill, Canada. Purchase. 41187.

CHAPMAN, Mrs. E. M., Washington, D. C.: Ancient and modern silver and copper coins. 41018.

CHERRIE, GEORGE K., Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y.: Six bats from Venezuela. 39808.

CHESNUT, V. K., Bozeman, Mont.: Three plants from Montana (39874; 39890). (See also under Department of Agriculture.)

CHICAGO ACADEMY OF SCIENCES, Chicago, Ill.: Received through Frank C. Baker, deep-sea shells from Yacatan Channel (gift) (40150); received through William K. Higley, 6 mounted birds (exchange) (41158).

CITIZENS' EXECUTIVE COMMITTEE, G. A. R. Encampment, 1902: Received through Barry Bulkley, secretary, 38 badges of the Thirty-sixth National Encampment of the G. A. R., held at Washington, D. C., October 6–10, 1902. 39977.

CLARK, Prof. HUBERT LYMAN, Olivet College, Olivet, Mich.: Received through Professor Wheeler, plant from Michigan (39964); lizards from Jamaica (40330); snake (*Eutania brachystoma*) from Michigan (40949); 4 batrachians from Michigan (41072); 11 fishes, including *Lycodontis moringa; Labrisomus pectinifer; Trachinotus; Monacanthus; Siphostoma; Fierasfer affinis*, and *Fundulus* (41227).

CLARK, T. B., New York City: Four specimens of ancient glassware from Syria. Purchase. 39736.

CLARK, Prof. WILLIAM B., Johns Hopkins University, Baltimore, Md.: Specimens

CLARK, Prof. WILLIAM B.—Continued.
of washings containing fossil Ostracoda. Exchange. 40395.

CLARKE, HOPEWELL, St. Paul, Minn.: Rocks and ores from near Winston, Mont. (39635); specimens of malachite and malachite calcite (39882).

CLEMENTS, F. E., Minnehaha, Colo.: Two specimens of *Sedum* from Colorado. 39768.

CLOONAN, E. A., St. Louis, Mo.: Dragonfly, *Anax junius* Drury. 39865.

CLUTE, W. N., Binghamton, N. Y.: Thirty-five ferns from New Zealand, collected by C. C. Armstrong. Purchase. 40284.

COCKERELL, Prof. T. D. A., East Las Vegas, N. Mex.: Unio from New Mexico (39862); Coleoptera, Diptera, Hymenoptera and other orders (39888); 16 specimens (4 species) of hymenopterous parasites (39999); 90 specimens of insects from New Mexico (40115); 47 parasitic Hymenoptera, bred from coccids collected at Zapotlan, Mexico, by Prof. C. H. Tyler Townsend (40204); insects, mollusks, and crustaceans (40255); cotype of *Lamprempis chichimeca* Wheeler and Melander, from Mexico (40257); carboniferous fossil, 3 mesozoic fossils and 7 fossil plants (40458); 471 specimens of insects, including Diptera, Trichoptera, Coleoptera, Orthoptera, Hymenoptera, Rhynchota, and Lepidoptera (40612); 3 specimens of cockleburs, *Xanthium* (40687); miscellaneous insects (40703); amphipods, leeches, and a geophilid from Las Vegas Hot Springs (40707); plant from New Mexico (40722); 2 plants from New Mexico (40725); 91 specimens of Lepidoptera, 24 specimens of Orthoptera, 39 specimens of Diptera, 63 specimens of Hymenoptera, and 1 specimen of Neuroptera (40998); miscelleneous insects (41042); mollusks and crustaceans from San Pedro, Cal. (41075); 11 land shells from Pecos, N. Mex. (41170). (See under Department of Agriculture.)

COCKS, R. S., New Orleans, La.: Two plants from Louisiana. 40803.

Coker, R. E., U. S. Fish Commission, Beaufort, N. C.: Annelids from Beaufort. 40978.

Coley, James, Norway, S. C.: Snake. 40841.

Collie, G. L., Beloit College, Beloit, Mich.: Nine species of Mokawkian fossils from the Bellefont section, Pennsylvania. 41008.

Collier, A. J. (See under Department of Agriculture; also under Interior Department, U. S. Geological Survey.)

Collins, F. S., Malden, Mass.: Seventy-five specimens of Algæ (39728); 100 specimens of plants (Phycotheca Boreali-Americana) (40362); 50 specimens of North American algæ (41205). Purchase.

Collins, G. N., and O. F. Cook, Department of Agriculture. Two dragonflies, stone-fly, and ant-lion from Tapachula, Mexico. 40096.

Collins, J. F., Providence, R. I.: Twenty-one specimens of violets from Rhode Island. Exchange. 40857.

Collins, William A., Waterbury, Conn.: Spider, *Argiope auratia* Lucas (= *Argiope riparia* Hentz). 39907.

Colt's Patent Firearms Manufacturing Company, Hartford, Conn.: Received through L. C. Grover, president. Two automatic Colt pistols (40481; 40999).

Columbia College, New York City. Plant obtained by Dr. M. Darlington at West Chester, Pa. 40898.

Comstock, Prof. J. Henry, Cornell University, Ithaca, N. Y.: Type specimen of *Lysiognatha comstockii*. 40997.

Congdon, J. W. (See under Miss Alice Eastwood.)

Cook, Prof. O. F., Department of Agriculture: Two specimens of Phrynids from Porto Rico (40098); 24 miscellaneous insects and arachnids from Porto Rico (40203). (See under New York Botanical Garden; also under G. N. Collins.)

Cooke, A. C., East Liberty, Ohio: Luna moth, *Actias luna* Linnæus. 39628.

Cooke, Dr. P. M., Denver, Colo.: Specimen of Grapevine leafhopper, *Typhlocyba vitis* Harris. 40097.

Cooke, W. W., Department of Agriculture: Nest and 3 eggs of *Helminthophila pinus*. 41225.

Cooper, William, Milo, Me.: Sample of rock with supposed traces of animal or plant life. 39743.

Cooper, W. B., U. S. National Museum: Bronze 50 cash, issued 1850–1851, by the Tartar dynasty, Chinese Empire. 40412.

Copper Queen Consolidated Mining Company, New York City. Received through James Douglas, president. Tinted stalactite and sections of Nacozari ores (39773); 2 sections of tinted stalactite (39755).

Coquillett, D. W., Department of Agriculture: 2,214 specimens of Diptera. 39585.

Corbett, L. L., Watkins, N. Y.: Seventeen stone implements. 40510.

Corning, J. H., Washington, D. C.: Cube of polished marble from quarry at Eakles Mills, Washington County, Md. 40237.

Cossmann, M. Maurice, Paris, France: Three species of rare Eocene fossils from the Paris basin. 39918.

Coughlin, Mrs. W. H. (See under Mather, Fred, estate of.)

Coville, F. V. (See under Department of Agriculture.)

Cox, Emery, Brightwood, D. C.: Screech owl, *Megascops asio*. 39797.

Cox, Miss Hazel, Brightwood, D. C.: Oven-bird, *Seiurus aurocapillus*. 39870.

Craighead, Erwin, Mobile, Ala.: Hoodoo charm used by the negroes of Alabama. 41160.

Crawford, Joseph, Philadelphia, Pa.: Plant. 39961.

Crawford, Lamar, Washington, D. C.: Stone implements, fragments of pottery, etc., from a rock-shelter on Spuyten Duyvil Creek, near Fort George, Manhattan Island, N. Y. 41004.

CRAWFORD, Mrs. MARGARET, Brightwood, D. C.: Snowy owl, *Nyctea nyctea*. 40986.

CROSBY, D. J., Department of Agriculture: Specimen of *Panax quinquefolium* collected in Virginia. 40454.

CROSBY, F. W. Washington, D. C.: Trilobites from Mount Stephens on the Canadian Pacific Railroad (gift) (39980); glacial clay from West Seattle, Wash. (purchase) (40027); 2 specimens of concretionary diorite from near San Diego, Cal. (gift) (41049).

CROSBY, W. O., Massachusetts Institute of Technology, Boston, Mass.: Specimen of native arsenic from Santa Cruz County, Ariz. Exchange. 40399.

CROSS, L. T. (See under Montello Granite Company.)

CROSS, WHITMAN. (See under Interior Department, U. S. Geological Survey.)

CROWLEY, J. J., Logan, Mont.: Received through Department of Agriculture. Plant from Montana. 41146.

CROZIER, Brig. Gen. WILLIAM, U. S. A. (See under War Department.)

CUMMINS, M. D., Pierceton, Ind.: Arrowheads, hatchets, and fossils from Kosciusko County, Ind., and 3 specimens of ore from Colorado and Kansas. 39735.

CURRIE, R. P., and H. S. BARBER, U. S. National Museum: 3,982 insects representing different orders from Plummers Island, Maryland. 40106.

CURRY, Capt. GEORGE. (See under Hon. Bernard S. Rodey.)

CURT, C. F. (See under Department of Agriculture.)

CURTISS, A. H. (See under Department of Agriculture.)

CUSHING, Mrs. F. H., Garrett Park, Md.: Forty-six blankets, baskets, pottery, and other articles. Purchase. 41193.

CUSHING, FRANK H. (deceased). (See under Smithsonian Institution, Bureau of Ethnology.)

CUSICK, W. C., Union, Oreg.: Two specimens of *Sedum* from Oregon (40034); 24 plants from Oregon (40500).

CUTTS, Mrs. F. G., Riverside, Wash.: Pupa of Sphinx-moth. 41209.

DAGGETT, Hon. JOHN, Black Bear, Cal.: Piece of twine used by the Indians of the Lower Klamath River in making their nets, and specimen of plant from which a fiber resembling hemp is obtained. 39798.

DANIEL, J. W., jr., Washington, D. C.: Bat (*Molossus fosteri*); rat (*Oryzomys*), from Sapucay, Paraguay. 41062. (See under A. Royster.)

DANIEL, Dr. Z. T., Siletz Indian Agency, Oreg.: Brass key and a potato masher. 39677.

DANIELS, L. E., Indianapolis, Ind.: Twenty-five specimens of Carboniferous insects. Deposit. 40339.

DANNEFAERD, S., Auckland, New Zealand: Two specimens of *Apteryx lawyeri* from Stewart Islands, New Zealand. Purchase. 40075.

DANNEHL, HENRY. (See under James McDonnell.)

DARLINGTON, Dr. M. N. (See under Columbia College, New York.)

DAVENPORT, Dr. C. B., University of Chicago, Chicago, Ill.: Four species of fresh-water bryozoans. 40611.

DAVENPORT, H. C., East Orange, N. J.: Trapogan Pheasant, *Trapopan satyra* (40134); Sonnerat's Jungle fowl, *Gallus sonnerati*, and a Brazilian tree duck, *Dendrocygna viduata* (40467); Trapogan Pheasant (*Ceriornis*) (40496); 7 birds, in the flesh, including 3 specimens new to the Museum collection (40683); Bean goose (40747); 3 specimens of Black-winged peacock, *Pavo nigripennis;* also 3 specimens of *Gallus lafayetti*, *Pavo cristatus* variety (41125); specimen of *Gallus varius* and a specimen of *Chrysolophus amherstiæ* (41178); Java peacock, *Pavo muticus;* 3 Jungle fowls (*Gallus bankiva*) and a hybrid *Gallus bankiva* × *sonneratii* (41184).

DAVIDSON, A., Los Angeles, Cal.: Four plants from California (40934; 41069).

DAVIS BROTHERS, Diamond, Ohio: Four-barrel Remington pepper-box pistol (40607); six-shot revolver, Maynard patent, 1845; six-shot Connecticut Arms Company revolver, 1834 (40944). Purchase.

Davy, J. B. (See under Department of Agriculture.)

Dauley, Cole, Dade City, Fla.: Spider (*Acrosoma gracile* Walkener). 40447.

Day, Dr. D. T., U. S. Geological Survey: Two specimens of magnetite from the eastern section of Porto Rico (40854); minerals from Santa Catalina Island, California, collected by Mr. Splittstoeser (40874). (See also under Interior Department, U. S. Geological Survey.)

Dayton, C. N., New York City: Twenty-four photographs. Purchase. 41060.

Deam, C. C., Bluffton, Ind.: Three specimens of *Trillium* (40698); 4 plants representing the species *Cardamine pennsylvanica* Möhl and *Trillium sessile* L. (41021).

Deane, Cecil A. (See under Smithsonian Institution, Bureau of Ethnology.)

Dedrick, A. V., Seattle, Wash.: Specimens of stream tinstone and iron, from a placer deposit on Buck Creek. 40393.

Deemer, Christian, National Military Home, Dayton, Ohio: Two brass screws and a gilded wooden ball from the U. S. S. *Cumberland*. 40132.

Deinard, Ephraim, Kearny, N. J.: Hebrew ceremonial objects. Purchase. 39909.

De Kalb, W. C., U. S. Fish Commission: Leaves and flowers of *Nymphæ variegata* from Tar Kiln Pond, near Little Sebago Lake, North Windham, Me. 39608.

Delay, C. R., Nuthall, Ind. T.: Copy of ordinance to dissolve the union between the State of Mississippi and other States. 39790.

Demokidoff, K., St. Petersburg, Russia: Five specimens of hymenopterous parasites representing 2 species (40708); 2 hymenopterous parasites (*Catolaccus* (*Pteromalus*) *pellucidus* Förster) (41197).

Dempsey, P. O., Langdon, D. C.: Piece of wood from Chancellorsville battlefield, transfixed by a ramrod. Purchase. 40741.

Denton, S. F., Wellesley Farms, Mass.: Six mounted fishes, including *Exocœtus volitans*, *Lactophrys tricornis*, *Scarus*

Denton, S. F.—Continued.
cœruleus, *Scarus vetula*, *Pseudoscarus guacamaia*, and *Diodon hystrix*. Purchase. (See also under U. S. Fish Commission.) L. P. X. 40678.

De Peer, Howard, Carlock, Ill.: Specimen of *Leptocoris trivittata* Say. 40144.

Deschamps, Emile, Shanghai, China: Fishes from India, and crustaceans, echinoderms, insects, and shells from Singapore and vicinity. Purchase. 39708.

Dewey, L. H. (See under Department of Agriculture.)

Dey, J. H., Evergreen, Ala.: Eggs of *Microcentrum retininerve*. 40099.

Deyrolle, Les fils d'Emile, Paris, France: Twenty-two specimens of Mesozoic corals from France (40793); small collection of mammals (41017). Purchase.

Dickinson, W. E., New York City: Two Aleutian baskets (purchase, L. P. X.) (40876); Aleutian baskets (purchase) (40877).

Didcott, John, Ottawa, Ohio: Carved elk horn. Purchase. L. P. X. 40781.

Diller, Dr. J. S. (See under Interior Department, U. S. Geological Survey.)

Dinwiddie, Courtenay, Greenwood, Va.: Parasitic wasp (*Mutilla occidentalis* Linnæus). 39843.

Dinwiddie, W. W., U. S. Naval Observatory, Washington, D. C.: Specimens of marcasite and lignite from Washington, D. C. (39906; 40376.)

Disbrow, Dr. W. S., Newark, N. J.: Two coin balances and an astronomical model. 40279.

Ditmars, R. L., New York Zoological Park, New York City: Five young water snakes from South Carolina 39896; 39897.

Doane, R. W., Fisheries Experiment Station, Pearson, Wash.: Shrimps. 40533.

Dodge, Byron E., Davison, Mich.: Stone relics. Deposit. 8037.

Dodge, C. K. (See under E. L. Morris.)

Dodge, G. M., Louisiana, Mo.: Nine specimens of Lepidoptera. 40477.

DOUGLAS, JAMES. (See under Copper Queen Consolidated Mining Company.)

DOTY, C. E., Washington, D. C.: Forty-one photographs of scenes in Habana and vicinity. 40304.

DOUVILLE, Prof. HENRI. (See under Paris, France, École des Mines.)

DOWELL, PHILIP, U. S. National Museum: Plants from Connecticut, District of Columbia, and other localties. (39830; 39950; 39951.)

DRAKE, C. M., Eureka, Cal.: Specimen of *Boschniaka strobilacea* Gray, from California. 39948.

DRESDEN, GERMANY, Royal Zoological and Anthropological-Ethnographical Museum: Received through Dr. A. B. Meyer. Small mammals (40668); specimens of *Scops manadensis* from Celebes (40791). Exchange.

DRIVER, F. W., Montserrat, West Indies: Three lizards. 39747.

DUDLEY, J. G., National Zoological Park, Washington, D. C.: Red bat, *Lasiurus borealis*. 41088.

DUGÈS, Dr. A., Guanajuato, Mexico: Fifty-three specimens of Mexican insects (gift) (39935; 40573); 32 insects (exchange) (40121); parasitic insects (gift) (40593); 14 wasps and a bee (gift) (40878).

DUMAREST, Rev. M. (See under Smithsonian Institution, Bureau of American Ethnology.)

DUNCAN, E. M. (See under W. C. Barnes.)

DUPREY, H. F., Santa Rosa, Cal.: Twenty-seven flint arrowheads. 40742.

DURBAN, NATAL, AFRICA, Natal Botanic Garden: Received through J. Medley Wood, curator. One hundred South African plants. Exchange. 39801.

DURY, CHARLES, Cincinnati, Ohio: Thirty specimens, 8 species of Diptera (40375); 4 specimens of Diptera and Lepidoptera (1 species new to the collection) (40532).

DYAR, Dr. HARRISON G., U. S. National Museum: One hundred and six specimens of Diptera from Center Harbor, New York (40014); 229 specimens of

DYAR, Dr. HARRISON G.—Continued. insects (40148); plant from British Columbia (41167).

EAMES, Dr. E. H., Bridgeport, Conn.: Fifty-one plants from Connecticut. Exchange. 40317.

EASTWOOD, Miss ALICE, California Academy of Sciences, San Francisco, Cal.: Two specimens of Cotyledons from Santa Barbara (exchange) (39603); 7 plants from California (gift) (39784); co-type of *Spraguea pulchella* Eastwood, collected in California by J. W. Congdon (gift) (39828); 14 plants from California (40800; 40813; 41112; 41149; 41202). (See also under California Academy of Sciences.)

EATON, A. A., Seabrook, N. H.: One hundred specimens of *Pteridophyta* from New England (40389); 50 specimens of *Equisetum* from Massachusetts (40730). Exchange.

EATON, Dr. T. T., Louisville, Ky.: Blank check on the Bank of Martinique. 41188.

EDWARDS, VINAL N. (See under U. S. Fish Commission.)

EGGLESTON, W. W., Rutland, Vt.: Four plants from Vermont. 40139.

EGYPT EXPLORATION FUND, London, England: Received through Miss Emily Patterson. Ten pieces of Egyptian papyri. 39965.

EHRHORN, EDWARD M., Mountain View, Cal.: Received through Department of Agriculture: One hundred and seventy-nine specimens of insects, including Rhynchota, Diptera, and Hymenoptera. 40702.

EIGENMANN, Dr. C. H., Indiana State University, Bloomington, Ind.: Twenty-seven specimens (4 species) of crustaceans from Cuba. 40026. (See also under Indiana, University of.)

EISEN, Dr. GUSTAV, San Francisco, Cal.: Received through Dr. L. O. Howard: Two hundred and twenty-three specimens of insects from Antigua and Guatemala, including Hymenoptera, Hemiptera, Orthoptera, and Neuroptera. 40174.

Elliot, D. G., Field Columbian Museum, Chicago, Ill.: Two bats. 40186.

Elliott, C. B., Riverside, Conn.: Crab-spider, *Acrosoma rugosum* Htz. 39903.

Elliott, R. M., U. S. Fish Commission: Turtle, *Kinosternon pennsylvanicum*, from the Potomac River. 41057.

Ellis, George W., Monrovia, Liberia: Two hundred and fourteen ethnological specimens. Loan. 8512.

Elmer, A. D. E., Paloalto, Cal.: Two hundred plants from California. Purchase. 40062.

Emerson, A. S. (See under National Marble Company, Murphy, N. C.)

Emerson, Prof. B. K., Amherst College, Amherst, Mass.: Fourteen specimens of diabase and associated rock from Massachusetts. 40343.

Emmons, Lieut. G. T., U. S. N., Princeton, N. J.: Tobacco bag, Kuskokwim lamp, 2 berry-winnowing baskets and 37 gambling sticks (exchange) (40054); Alaskan basket (gift) (40055); set of tools used by a Tlinkit Indian wood-carver in making dugout canoes, masks, etc. (gift) (40238); ethnological objects from British Columbia (purchase) (40349); baskets, masks, and other objects (purchase) L. P. X. (40383); South coast basket (exchange) (40881); 2 masks, 2 mortars, wand club, and a wooden figure (purchase) (41221). (See under Smithsonian Institution, Bureau of American Ethnology.)

English, G. L., & Co., New York City: Nineteen specimens of minerals (purchase) (40155); specimen of anargite and 2 specimens of fluorite (purchase) L. P. X. (40156); 8 specimens of minerals (purchase) L. P. X. (40590); 9 specimens of minerals from the Andes of Ovalle, Chile (purchase) L. P. X. (40958).

Entwistle, W. B., Washington, D. C.: Specimen of Florida galinule, *Gallinula galeata*. 39983.

Esopus Millstone Company, Kingston, N. Y.: Received through Mr. A. Hayes. Small millstone from quarries near Accord, N. Y. 39921.

Esterley, G. W., Washington, D. C.: Caseworm (*Thyridopteryx ephemæformis* Hald). 39629.

Evermann, Dr. B. W., U. S. Fish Commission, Washington, D. C.: Plants, land and fresh-water shells from California. (40324; 41044.)

Fahs, R. Z., Kirkland, Wash.: About 50 specimens (11 species) of land and fresh-water mollusks from the northwestern section of the United States. 40487.

Fall, Prof. H. C., Pasadena, Cal.: Thirty-seven beetles, 30 being cotypes. 40210.

Fargo, J. F.: Received through Mr. Wirt Tassin, U. S. National Museum. Corundum in granite from San Antonio Canyon, San Bernardino County, Cal. Exchange. 40955.

Farrington, Prof. O. C. (See under Field Columbian Museum.)

Faxon, Dr. Walter. (See under Museum of Comparative Zoology.)

Featherstonhaugh, Dr. Thomas, Washington, D. C.: Three watch movements. 40325.

Ferguson, A. M., University of Texas, Dallas, Tex.: Specimen of *Sedum* from Texas (40629); plant from Texas (40629).

Ferguson, C. B., Sulzer, Prince of Wales Island, Alaska: Specimen of epidote. 40129.

Fernald, M. L., Gray Herbarium, Cambridge, Mass.: Twenty plants from Maine. Exchange. 40815.

Ferris, C. C., San Diego, Cal.: Butterfly (*Thecla humuli* Harris). 40161.

Fewkes, Dr. J. Walter, Bureau of American Ethnology: Eleven torches from Porto Rico and 2 saddle baskets (40914); 2 Spanish swords (40927); cylindrical basket made from a palm-leaf sheath, in open-coiled work with cover, made by prisoners in a Porto Rican prison (40113); bond indemnity for possession of slaves, issued in Porto Rico, April 6, 1876 (41054).

Fible, Miss Sarah, Philadelphia, Pa.: Hat, belt, unfinished belt, baskets, and specimens of raphia. 39938.

FIELD COLUMBIAN MUSEUM, Chicago, Ill.: Plaster cast of a stone collar (exchange) (40162); received through Mr. F. J. V. Skiff, director, cast of sculptured cylindrical stone (exchange) (40351); received through Prof. S. E. Meek, reptiles and batrachians from Mexico (exchange) (40379); meteorite from Saline Township, Kans. (exchange) (40585); received through Dr. O. C. Farrington, section of meteorite from Indian Valley, Floyd County, Va. (exchange) (40853).

FINN, LOUIS D., Blacksburg, S. C.: Specimen of iron ore and asbestos from mines near Blacksburg. 40740.

FISCHER, V. G., Washington, D. C.: Three baskets and a leather water bottle. 40043.

FISH COMMISSION, U. S., Hon. G. M. Bowers, Commissioner: Paddle-fish, Dog-fish, and Gar-pike (39959); Cirripeds from Porto Rico, collected by the steamer *Fish Hawk*, in 1889 (39998); received through Vinal N. Edwards, crabs, shrimps, and fishes from Woods Hole, Mass. (40084); molds of fishes made by S. F. Denton for the Fish Commission exhibit at the World's Columbian Exposition (40186); dried plants from islands in the central Pacific Ocean, obtained during the cruise of the *Albatross* in 1899–1900 (40199); 4 specimens (type and cotypes) of *Procelsterna saxatilis* from Necker Island (40215); crabs representing the genus *Panopeus*, from Sheepscot River, Maine, collected by W. C. Kendall (40363); crustaceans, corals, and mollusks collected during the *Albatross* Hawaiian Expedition of 1902 and the Samoan Expedition of the same year (40409); received through Dr. C. H. Gilbert, Hawaiian (*Albatross*) crustaceans and corals (40520); received through Dr. D. S. Jordan, Japanese fishes collected by the steamer *Albatross* (40525); types and several cotypes of fishes collected in Maine by W. C. Kendall (40673); specimen of darter, *Hadropterus evermanni*, cotype, collected in Lake Tippecanoe, Indiana, by W. J. Moenkhaus (40686); about

FISH COMMISSION, U. S.—Continued. 1,000 specimens of land and fresh-water shells from Indiana (40807); imperfect skeleton of a cetacean representing the species *Pseudorca crassidens* (40812); plants collected by Mr. Chancey Juday at Twin Lakes, Colorado (41091); 81 birds' skins, principally from Laysan Island, birds' eggs and nests from Laysan Island and Necker Island, and 2 human skulls and fragments of skulls from Lanai, Hawaiian Islands (41092). (See under Dr. O. P. Jenkins.)

FISHER, Dr. A. K., Department of Agriculture: Nest and 4 eggs of *Helminthophila pinus*. 41226. (See also under Department of Agriculture; and Hardin Irwin.)

FLEMING, J. H., Lake Joseph, Muskoka, Ontario, Canada: Specimen of *Nymphæa variegata* from Lake Joseph. 39689.

FLETCHER, Dr. JAMES, Central Experiment Farm, Ottawa, Canada: Specimens of *Nymphæa hybrida* and *Nymphæa variegata* (39704); received through Dr. L. O. Howard, cynipid gall (39758); 25 specimens of Lepidoptera (40484); 3 plants from Canada (40561). (See under Department of Agriculture.)

FLETCHER, ORRIN K., Acting Hospital Steward, Manila, Philippine Islands: Two eggs of *Megapodius cummingi* from the Philippine Islands. 40701.

FLETT, J. B., Tacoma, Wash.: Specimens of *Nymphæa polysepala*, and 120 plants from Washington (gift and exchange). 39606; 40111. See under Department of Agriculture.)

FLINT, Dr. JAMES M., U. S. N. (retired): Japanese martin (*Mustela*). 40352.

FOHS, F. J., Marion, Ky.: Specimen of fluorite (gift) (40660); 19 species of subcarboniferous fossils and 2 specimens of prismatic sandstone (gift) (40721); specimen of fluorite (exchange) (40798).

FOOTE MINERAL COMPANY, Philadelphia, Pa.: Fourteen specimens of minerals from various localities (purchase) (40127); tourmaline in lepidolite from

FOOTE MINERAL COMPANY—Continued. Mesa Grande, Cal. (purchase) (40380); 11 specimens of minerals from various localities (purchase) (40571); 23 specimens of minerals from various localities (exchange) (40711); 6 specimens of minerals (purchase) (40956). L. P. X.

FOOTE, WARREN M., Philadelphia, Pa.: Specimens of footeite. 40713.

FOREST AND STREAM PUBLISHING COMPANY, New York City: Two brook trout, *Salvelinus fontinalis*. 40784.

FORESTRY BUREAU. (See under Bureau of Agriculture, Philippine Islands.)

FOSS, Capt. F. E., U. S. N., Washington, D. C.: Relic taken from a church in Paranaka province, Philippine Islands, 40424.

FOSTER, FREDERIC DE P. (See under Saint Nicholas Society.)

FOSTER, WILLIAM, Sapucay, Paraguay, South America: Mammal skins, birds' eggs, 23 birds' nests and 11 birds' skins, also collection of natural history specimens (39979; 40346; 41039); 721 specimens of insects (41122). Purchase.

FOWKE, GERARD, Chillicothe, Ohio: Prehistoric Indian relics; 12 flint nodules from near Corydon, Ind. (40160; 41217). (See under Smithsonian Institution, Bureau of American Ethnology.)

FRANCK, GEORGE. (See under American Entomological Company.)

FRANK, H. L., President Montana Sandstone Company, Butte, Mont.: Received through J. E. Horsford, Helena, Mont. Samples of sandstone, onyx, and granite from Montana. 40342.

FRANSCESCHI, Dr. C. F., Santa Barbara, Cal.: Seeds from California. 40726.

FRASER, Dr. W., Corwith, Iowa: Sphinx-moth. 39835.

FRENCH, Dr. CECIL, Washington, D. C.: Young wild turkey from near Warrenton, Va. (40123); canvas-back duck (40353); skin of Cinnamon teal, *Querquedula cyanoptera*, from Texas (40476).

FRIEND, EDGAR N., Washington, D. C.: Specimen of lead-covered telephone cable. 40516.

FRIERSON, L. S., Frierson, La.: Three specimens of *Meretrix* from China (39605); fresh-water shells (40312); 8 specimens of weevils representing the species *Chalcodermus æneus* Boheman (41105).

FRYER, Mrs. M. A. B., Kingston, Jamaica: Carved stone metate. Purchase. 40001.

GALPIN, Rev. F. W., Hatfield Vicarage, Harlow, England: Two reproductions of musical instruments, viz, a zinck or zinker of German manufacture during the sixteenth century, and an Italian Cromorna. 40023.

GANT, J. H. (See under Department of Agriculture.)

GARDNER, N. L., University of California, Berkeley, Cal.: Two specimens of Cotyledons from California. 41024.

GARRETSON, CHARLES, Reliance, Va.: Wild cat, *Lynx rufus*. Purchase. 40408.

GEARHART, PETER, Clearfield, Pa.: Worm belonging to the genus *Gordius*. 39933.

GEE, N. GIST, Soochow University, Department of Natural Sciences, Soochow, China: Three small miniature figures carved in wood. 40550.

GERRARD, E., & SONS, London, England: Skeleton of an Australian goose, *Cereopsis novæ hollandæ*. 39645.

GILBERT, Mrs. A. P., Logan, Okla.: Specimen of *Eremobates pallipes* Say. 39746.

GILBERT, Dr. C. H. (See under U. S. Fish Commission.)

GILL, DE LANCY. (See under Smithsonian Institution, Bureau of Ethnology.)

GILVE, A. P., Logan, Okla.: Sulphugid, *Eremobates pallipes* Say. 39819.

GIRAULT, A. A., Virginia Polytechnic Institute, Blacksburg, Va.: Four specimens of parasitic Hymenoptera (40681); 4 specimens of *Synergus batatoides* Ashm. (40918).

GLENN, Prof. L. C., Vanderbilt University, Nashville, Tenn.: Meteorite from 3 miles northwest of Hendersonville, N. C. Exchange. 41155.

GOLDMAN, E. A., Washington, D. C.: Fourteen plats from Mexico and California. (39809; 40699.) (See under Department of Agriculture; also under Mrs. N. M. Brown).

GOLDSMITH, B., Washington, D. C.: Badge presented to Spanish War Veterans by the District of Columbia. Purchase. 39905.

GORBY, S. S. (See under Hon. J. H. Stotsenburg.)

GORDON, JAMES B., Stonington, Me.: Cube of granite from quarries at Crotch Island, Maine. 39952.

GORMAN., M. W. (See under Department of Agriculture.)

GOULD, Miss M. M. (See under Smithsonian Institution, Bureau of Ethnology.)

GOVERNMENT BOARD, PAN-AMERICAN EXPOSITION, Buffalo, N. Y.: Received through Hon. J. H. Brigham, chairman. Philippine collection of ethnological objects and natural-history material exhibited under the Government Board at the Exposition. Deposit. 39609.

GRABAU, Dr. A. W., Columbia University, New York City: Specimens of Rochester shale fossils from western New York. Exchange. 40864.

GRANT, Brig. Gen. F. D., U. S. A. (Bequeathed by Mrs. Julia Dent Grant to the National Museum): Ancient Japanese gold cabinet presented to Mrs. Grant by the Empress of Japan; pair of modern bronze vases presented to Mrs. Grant by the Emperor of Japan; lady's gold toilet set and seven cups presented to Mrs. Grant by the King and Queen of Siam; lady's ornamental scent bottle made of filagree silver and sent to Mrs. Grant by the Maharaja of Dekkan; Japanese poems written by a celebrated Japanese poet and presented to General Grant during his visit in Japan; dress worn by Mrs. Grant at the second inaugural ball of General Grant; pair of white satin slippers worn by Mrs. Grant; Siamese chest of bamboo and gilt presented to Mrs. Grant by the King and Queen of Spain (40392); 24 relics of General Grant, including regulation riding boots and belt, saddle, valise, commissions, addresses of welcome, menu cards, certificates of membership to various military and other orders, etc. (40682).

GRANT, Brig. Gen. F. D., U. S. A., San Antonio, Tex.: Shoulder straps worn by himself during the Porto Rican campaign and in the Philippine Islands (gift) (40692); sword worn by himself during the Spanish-American war (gift) (40838); death mask of the late Gen. U. S. Grant (deposit) (8152).

GRANT, F. H. McK., North Carlton, Melbourne, Victoria, Australia: Specimen of Upper Silurian starfish and a specimen of Lower Silurian cephalopod. Exchange. 40295.

GRANT, GEORGE B., Pasadena, Cal.: Plant from California. 40993.

GRANT, JESSE R. (See under Brig. Gen. F. D. Grant.)

GRANT, U. S. (See under Brig. Gen. F. D. Grant.)

GRAVES, Dr. C. B., New London, Conn.: Sixteen specimens of violets from Connecticut. Exchange. 40219.

GRAY HERBARIUM, Cambridge Station, Boston, Mass.: Two hundred and twenty-five plants from different localities (exchange) (40101); 3 plants from California and Mexico (gift) (40218); 34 plants from various localities (exchange) (40816).

GREBLE, Mrs. E., Washington, D. C.: Three baskets. Loan. 7908. (Returned.)

GREEN, R. A., U. S. National Museum: Bat (*Myotis subulatus*), from Maryland. 39841.

GREGER, D. K., Fulton, Mo.: Three species of marine shells (gift) (39729); Cambrian fossils from Potosi, Mo., and vicinity (exchange) (39744); 5 specimens of *Rhynchonella striatocostata* from the Upper Choteau limestone of Tabius River, Knox County, Mo. (exchange) (40785).

GREGORY, V. H., Chiswick, London, England: Ten meteorites. Purchase. 40619.

GRIFFITH, DAVID. (See under Department of Agriculture.)

GRINNELL, JOSEPH, Palo Alto, Cal.: Two skins (topotypes) of *Dendroica æstiva brewsteri*. 40895.

GRINOLD, EMERSON R., Grand Ledge, Mich.: Cast of Indian pipe in Grand Ledge fire clay. Exchange. 40488.

GROUT, Dr. A. J., Brooklyn, N. Y.: Fifty specimens of mosses from the United States and Ecuador (exchange) (40046); 50 specimens of mosses from the United States (purchase) (40491).

GROVER, L. C. (See under Colt's Patent Fire Arms Manufacturing Company.)

GRUBBS, Dr. R. B., assistant surgeon U. S. A., Iligan, Philippine Islands: Snake, scorpion, and slug from the Philippine Islands. 40233.

GRUMBACH, Ernest, Pueblo, Cal.: Opossum (*Marmosa murina*). 40179.

GUERDRUM, S. C., Mount Pleasant, Washington, D. C.: Mammals from Iowa. Purchase. 39996.

GUTHRIE, OSSIAN, Chicago, Ill.: Glacial bowlders from Sacket Harbor, N. Y. 40497.

HAGGETT, Mrs. G. B., Zuñi, N. Mex.: Three Zuñi baskets of modern manufacture. 39741.

HALL, Miss Annie S., Cincinnati, Ohio: Gold medal presented to Charles Francis Hall by the Société de Géographie of France. 40030.

HALL, H. M., University of California, Berkeley, Cal.: Fifty plants from California. (39831, 40628, 40759, 40885, 40904, 40935, 41084). (See also under Department of Agriculture.)

HALL, H. O., Washington, D. C.: Received through Department of Agriculture. Plant from Maryland. 40035.

HAMILTON, S. H., American Museum of Natural History, New York City: Two specimens of manganese from Panupo, Santiago, Cuba. Purchase. 39587.

HAMMELL, John, Madison, Ind.: Specimens of Richmond fossils. Exchange. 40307.

HANLEY, D. T., Baltimore, Md.: Five-barreled revolver. Purchase. 40851.

HANSON, Dr. C. C., Ocoto, Wis.: Collection of Buddhistic religious objects. Purchase. 39920.

HARDESTY, Owen G. (See under Smithsonian Institution, Bureau of Ethnology.)

HARDING, E. H., Washington, D. C.: Pair of silver spectacles worn by John Harding, aid to General Washington during the war of the Revolution. 40413.

HARPER, R. M., Collegepoint, N. Y.: Twelve specimens of *Dryopteris floridana* from Georgia (exchange), (40047); 155 specimens of Algæ, fungi, Bryophita and Pteridophyta collected in Georgia (purchase), (40504); about 40 specimens of Cretaceous and Eocene fossils from western Georgia (gift), (40507); 505 plants from Georgia (purchase), (40685); 2 plants from Virginia, received through the Department of Agriculture (41129).

HARRIMAN ALASKAN EXPEDITION. Received through Prof. Trevor Kincaid, Univerity of Washington, Seattle, Wash.: Isopods. 40695.

HARRINGTON, W. HAGUE, Ottawa, Canada: Received through Dr. L. O. Howard. Nine specimens of Diptera. 40333.

HARRIS, Lieut. Jesse R., U. S. A., Washington, D. C.: Brass coin balance. 40498.

HARRIS, L. C., Eldorado, Cal.: Cranium of a Digger Indian found in a cave, and a sacrificial bow from a medicine lodge. 41156.

HARRISON, D. C., Bay Bank, Hampton, Va.: Three plants from Virginia. 41148.

HARSHBERGER, J. W., University of Pennsylvania, Philadelphia, Pa.: Received through Department of Agriculture. Eighty-seven plants from Mexico and the West Indies. 39925.

HARTERT, Ernst. (See under R. H. Beck.)

HARTLEY, Frank, Cumberland, Md.: Material containing minute fossils (39685); fossils, corals, and ostracoda (39919).

HARVEY, Frank, Albuquerque, N. Mex.: Nineteen photographs of Indian basketry. 39823.

HARVEY, Fred, Kansas City, Mo.: Fourteen specimens of Washoe baskets. Purchase. 41185.

HARVEY, Prof. R. V., Vancouver, British Columbia: Seven moths. (39654, 40093.)

HASSALL, Dr. ALBERT, Bureau of Animal Industry, Department of Agriculture, Washington, D. C.: Eleven specimens (2 species) of *Calliphora fortunata* Walk. and *Calliphora dux* Esch., from the Philippine Islands. 40015.

HASSE, Dr. H. E., Soldiers' Home, Cal.: Sixteen plants from California (39602; 39661; 39853; 39855).

HATHAWAY, ISAAC, Lexington, Ky.: Cast of the Bath Furnace meteorite. Purchase. L. P. X. 40852.

HATRY, OTTO, Pittsburg, Pa.: Forty-five plants from Pennsylvania. Exchange. 41171.

d'HAUTVILLE, Mrs. F. G., received through Mrs. Frank Wheaton, Washington, D. C.: Personal relics of Gen. Alexander Macomb, U. S. A. Loan. 8501.

HAY, Prof. W. P., Washington, D. C.: Two specimens of *Nymphæa advena* from near Pocomoke City, Md. (39829); 5 specimens of *Polypodium polypodioides* collected near Great Falls, Md., (40456); weasel from near Chevy Chase, Md. (41208).

HAYCRAFT, C. P., Fellowship, Fla.: Echinoid of the genus *Macropneustes* from the Gulf coast near Fellowship. 39867.

HAYES, A. (See under Esopus Millstone Company.)

HAYWAID, JOSEPH M., St. George, Bermuda: Specimen of soft stone impregnated with sea shells; 2 specimens of hard sandstone, and 2 shells. 40757.

HEATON, C. M., Takoma Park, D. C.: Morse register and a relay, 1848. 39777.

HEIDEMANN, OTTO, Department of Agriculture: One hundred and sixty-one species of North American Hemiptera (39838); 2 types of *Perigenes gallax* Heidemann (40133).

HEIDENHEIMER, E., Washington, D. C.: Sextant made by W. Desilva, of Liverpool, England. Purchase. 41038.

HEISMAN, J. J., Lititz, Pa.: Six butterflies. 40752.

HELLER, A. A., Lancaster, Pa.: Four hundred and fifty plants from California (purchase) (39709); plant (gift) (39769); 545 plants from California (purchase) (40081); 27 plants from Pennsylvania (exchange) (40201); 53 plants from California, collected by Messrs. Heller and Brown (gift) (40575); 109 plants from California (gift) (40576); 36 specimens of ferns, cassias, and umbelliferæ from Porto Rico (gift) (40630); 460 plants from California and Porto Rico (purchase) (40636); 2 plants from California (gift) (41113).

HELMAN, W. E., London, England: Thirty birds' eggs from Iceland and England. Exchange. 41020.

HEMP, Miss A., Jefferson, Md.: Hair ball from the stomach of an ox. 40066.

HENLY, Miss K., Fort Myer Heights, Va.: Saddle-back caterpillar, *Sabine stimulea* Clemens. 40146.

HENSHAW, H. W., Hilo, Hawaii: Worms and crustaceans (39887); land and fresh-water shells from the Hawaiian Islands (40063); hermit-crab from a large *Dolium* (40340); sea serpent, *Hydrus platurus*, from Laupahoehoe, near Hilo (40420); 150 specimens of *Succinea* (40428); lizards (40671); 15 specimens of *Vitrina tenella* (41140).

HERBEIN, Dr. H. J., Pottsville, Pa.: Slabs showing fossil footprints. Purchase. 40570.

HERRERA, LOUIS A. DE. (See under Montevideo, Uruguay, Museo Nacional.)

HERZER, Rev. H., Marietta, Ohio: Mass of calcified seeds of hackberry, and 2 fossil plants (39754; 40655).

HEWETT, F., Lehigh University, Bethlehem, Pa.: Three specimens of tellurium from Vulcan mine, near Iola, Colo. 40378.

HIGGINS, W. (See under Interior Department, U. S. Geological Survey.)

HIGLEY, WILLIAM K. (See under Chicago Academy of Sciences.)

HILL, WALTER C., Brooklyn, N. Y.: Nine Dyak skulls (40410; 40845). Purchase.

HILLEBRAND, Dr. W. F., U. S. Geological Survey: Specimen of yttrialite. 40128.

HILLMAN, Prof. F. H., Department of Agriculture: Several specimens of parasitic Hymenoptera. 39817.

HITCHCOCK, Prof. C. H., Hanover, N. H.: Sixteen specimens of fossils from the Upper Silurian of Littleton, N. H.; 15 specimens from the Onondaga formation at Owl's Head, Lake Memphremagog, Vermont. Exchange. 40810.

HITE, P. T., jr., West Norwalk, Conn.: Saddle-back caterpillar of *Empretia stimulea* Clements. 39993.

HODGE, F. W., Smithsonian Institution: Tumble beetle (39632); diminutive Navaho blanket, made in 1895, and used as a badge by the National Irrigation Congress at Albuquerque, New Mexico (41218).

HOHIESEL, FRANK, New York City: Two pieces of cinder from Mount Pelée, Martinique. 40767.

HOLLAND, Dr. T. H., Director, Geological Survey of India, Calcutta, India: Specimen of meteorite, weighing 293 grams, from Shergotty, India. Exchange. 40847.

HOLLIGER, F. A., Findlay, Ohio: Trilobite (*Calymene niagarensis*). 40036.

HOLM, THEODOR, Brookland, D. C.: Specimen of *Gerardia holmiana*. 40068.

HOLMES, J. S., Bowmans Bluff, N. C.: Skin of "Moon eye," or "Toothed herring," *Hiodon selenops* (39732); Specimen of *Ophioglossum pusillum* from Texas (40321); specimen of silicified palmwood from Jasper, Texas (40674).

HOLMES, Dr. S. J., University of Michigan, Ann Arbor, Mich.: Amphipods from New England, including type specimens. 40579.

HOLMES, W. H., Chief, Bureau of Ethnology: Collection of flaked flints, and flint nodules from Wyandotte Cave, Indiana and vicinity (39612); fragments of pottery and bone implements collected from a mound near Kimmswick, Mo. (39827); 16 flints collected in Missouri (40899); 34 archeological specimens and ores collected in Missouri (40900). (See also under Smithsonion Institution, Bureau of Ethnology.)

HOLT, WILLIAM P., Geneva, Ohio: Clay-iron stone from Ashtabula Creek near Kingsville, Ohio. 39637.

HOLTON, Miss NINA G., Department of Agriculture, Washington, D. C.: Specimen of Cynipid gall, *Callirhytis seminator* Harris. 41005.

HOLZINGER, J. M. (See under Minnesota, University of.)

HOOPES, H. E., Media, Pa.: Bound collection of photographs of New Mexico and Arizona pueblos. 40432.

HORSFORD, J. E., Washington, D. C.: Psycho bicycle. 40967. (See under H. L. Frank.)

HORTSMAN, W. J., Busch, Oklahoma: Received through Interior Department, U. S. Geological Survey. Specimen of selenite. 41040.

HOTCHKISS, CHARLES R., Brownsville, Tenn.: Specimen of *Gordius*. 40896.

HOUGH, Dr. WALTER, U. S. National Museum: Two photographs of Healy wolf. 30926.

HOUSE, HOMER D., Oneida, N. Y.: Two specimens of *Hydrostis* and *Polygonella* from central New York. Exchange. 39851.

HOUSTON, Col. A. J., Beaumont, Tex.: Commission of Gen. Samuel Houston, 1835, Texas State army; commission as second lieutenant, Seventh Regiment U. S. A.; commission as first lieutenant, First Regiment U. S. A. Loan. 8536.

HOWARD, Dr. L. O. (See under Department of Agriculture; Thomas Brown; Gustav Eisen; Dr. James Fletcher; W. Hague Harrington; George B. King; G. van Roon.)

HOWELL, E. E., Washington, D. C.: Five specimens of minerals. 40954.

HOWLAND, FRANK, Little Rock, Ark.: Received through George F. Kunz. Silicified wood from 30 miles south of Little Rock. 40197.

HRDLICKA, Dr. A., U. S. National Museum: Covered basket of palm leaf made by the Yaki Indians, Sonora, Mexico; cigarettes and corn husks for covers, from the same tribe, and saddle bags made from the ixtle fiber com-

HRDLICKA, Dr. A.—Continued.
monly used in Mexico (40941); gun-barrel flute from Pueblo de Taos, New Mexico (40970); Springfield 45 fixed ammunition; powder and projectile made by the Yaqui Indians (40975); unfinished basket made by the Apache Indians (41043).

HUBBARD, H. G. (See under E. A. Schwarz.)

HUMPHREY, CHARLES, New York City: Ninety-two butterflies, 12 dragon flies, and a fulgorid. 40513.

HUMPHREYS, J. W., Colon, Colombia: Bat (*Artibeus*). 39893.

HUNTER, CLAY, Clifton, Ariz.: Four cases of a trichopterous insect. 40969.

HUNTER, WILLIAM, Washington, D. C.: Plant from the District of Columbia. 40479.

HUNTINGTON, J. H., Baker City, Oreg.: Rocks from Oregon. 39638.

HURLOCK, Miss M. C., Church Hill, Md.: Four plants from Maryland. (39791; 39847.)

HURTER, JULIUS, St. Louis, Mo.: Reptiles and batrachians. Exchange. 40398.

HUTCHINSON, C. E., Los Angeles, Cal.: Two hundred and seven specimens of insects. 41041.

IMPERIAL ACADEMY OF SCIENCES. (See under St. Petersburg, Russia.)

INDIANA, UNIVERSITY OF, Zoological Department, Bloomington, Ind.: Received through Prof. C. H. Eigenmann. Parasite from the side of a specimen of *Odontostilbe* from Arroyo, Trementina, Paraguay. 40744.

INTERIOR DEPARTMENT, U. S. Patent Office: Copies of 84 patents of autoharps and allied instruments. 40856.

United States Geological Survey: Four hundred specimens of Cambrian brachiopods (39642); whale vertebra—Pleistocene of Fort Caswell, N. C.; whale vertebra—Eocene of Castle Hayne, N. C.; tooth of *Deuden serratus* from the Eocene of Castle Hayne, and teeth of a Shark, *Carcharodon auriculatus*, from the Eocene of Castle Hayne (39648); economic material exhibited at the Charleston Exposition (39908); specimens of quicksilver ores from Texas, collected by Dr. D. T. Day (39954); sample of kaolin from Edgar, Putnam County, Fla., collected by T. Wayland Vaughan (39686); specimen of selenite from Death Valley, California, and a specimen of tungsten ore from the Snake range, Nevada, collected by F. B. Weeks (40058); 103 specimens of minerals from various localities (40131); left humerus of a fossil bison, probably representing the species *Bison crassicornis*, obtained by Arthur J. Collier at the Palisades on the Yukon (40242); fossil sponges collected by Hon. Charles D. Walcott at Little Metis, New Brunswick (40298); specimen of Arfvedsonite from St. Peter's Dome, east side of the gulch opposite Eureka tunnel, El Paso County, Tex., collected by Whitman Cross (40464); 87 thin sections of rocks from San Luis quadrangle, California, collected by Mr. Cross (40523); 62 specimens of rocks from Silver City, Idaho, quadrangle, collected by W. Lindgren (40546); reserve and duplicate collections from the Telluride quadrangle, Colorado (40595); Triassic fossils collected by Prof. S. Ward Loper in 1890–91 (40450); rocks and ores from Globe copper district, Arizona (40494); specimen of sandstone from Iron Mountain, Menominee district, Michigan (40632); tooth of Shark, *Cladodus formosus* (type), from Lime Mesa, Needle Mountains, Colorado (40662); 2 specimens of gypsum from Oklahoma, collected by Bailey Willis (40684); ores and rocks from Silver City and De Lamar, Idaho, collected by W. Lindgren (40719); rocks from Roseburg, Coos Bay, and Port Orford quadrangle, Oregon, collected by Dr. J. S. Diller (40735); reserve and exchange collections of rocks from Ellensburg quadrangle, Washington, collected by George O. Smith (40859); rocks from La Plata quadrangle, Colorado, reserve and

INTERIOR DEPARTMENT—Continued.
duplicates (40875); 3 specimens of minerals (40952); Crater Lake collection of rocks (40963); 140 specimens of *Triarthrus becki* from Rome, N. Y., with appendages, studied and described by Hon. C. D. Walcott (41011); rock-bearing gold (?) from Harris quarry, near Laceyville, Pa., collected by W. Higgins (41139); fossil wood and Hot Springs material from the Yellowstone National Park (41154); Lower Cambrian brachiopods of the genera *Obolus*, *Obolella*, *Lingulla*, *Lingulepis*, *Acrothele*, and *Orthis* (41173); collection of rocks from Ascutney Mountain, Vermont (41181); Oriskany fossils from Keyser, W. Va., and vicinity, collected principally by Ira Sayles. (See under J. W. Horstman.)

INTERNATIONAL ACHESON GRAPHITE CO. (See under W. O. Snelling.)

IRWIN, HARDIN, Havre, Mont. Received through Dr. A. K. Fisher: Salamander (*Ambystoma tigrinum*), from Montana. 40006.

JACKSON, J. W., Manchester, England: Fresh-water shells from England. (39820; 39926.)

JACKSON, SHELDON, Sitka, Alaska. Received through Department of Agriculture: Four plants from Unalaska River, Alaska. 39716.

JACKSON, SIDNEY WILLIAM, Sydney, Australia: Three hundred and twenty-nine shells (83 species) of Australian land shells (40806); 202 specimens (51 species) of fresh-water shells from Australia (41096). Purchase.

JACKSON, Miss VICTORIA, Bowling Green, Ky.: Fifteen species of land and fresh-water shells. 40471.

JAYNE, Mrs. J. L., Washington, D. C.: Samoan outrigger canoe. Deposit. 8422.

JENKINS, Dr. O. P., Leland Stanford Junior University, Stanford University, California: Received through U. S. Fish Commission. Type specimens of new species of fishes collected at Honolulu, Hawaii, in 1889. 40470.

JENKS, A. E. (See under Smithsonian Institution, Bureau of Ethnology.)

JENNINGS, J. H., Washington, D. C.: Specimen of Tung-Kwan-San, a medical powder. 40275.

JOHN, ANDREW, Washington, D. C.: Set of 8 pieces of Seneca Indian gambling dice. Purchase. 40840.

JOHNSON, Prof. C. W., Wagner Free Institute, Philadelphia, Pa.: Seven specimens of Diptera, including four cotypes. 39748.

JOHNSON, C. W., Boston Society of Natural History, Boston, Mass.: Nine specimens of Diptera. 40618.

JOHNSON, J. T., Galesburg, Ill.: Plant. 39699.

JOHNSTON, ELIZABETH BRYANT, Washington, D. C.: Two photographs of Indian groups (40739); plaster bust of George Washington made from the life mold by Jean Antoine Houdon at Mount Vernon in 1785 (41137).

JOHNSTON, Miss LOUISE, Wooster, Ohio: Costume of the Yow people of China. Purchase. 39910.

JONES, G. M., Richmond, Va.: Brass medal commemorating the departure of the American Army from Valley Forge. Purchase. 39611.

JONES, M. E. (See under Department of Agriculture.)

JONES, WYATT W., Bozeman, Mont.: One hundred and fifty plants from Montana. Purchase. 39857.

JORDAN, Dr. D. S. (See under U. S. Fish Commission; also under Leland Stanford Junior University.)

JUDAY, CHANCEY. (See under U. S. Fish Commission.)

KEARNEY, T. H. and W. R. MAXON, Washington, D. C.: Thirty specimens of plants collected on Plummers Island, near Cabin John, Md. 40460.

KELLERMAN, Dr. W. A., Ohio State University, Columbus, Ohio: Specimens of *Nymphæa advena* from Cadiz Junction, Harrison County, Ohio; Buckeye Lake, Ohio; and Martinton, W. Va. (39618; 39700; 39804); 2 specimens of *Nymphæa*

KELLERMAN, Dr. W. A.—Continued.
variegata from Ohio (39805); 7 plants from Ohio and West Virginia (40369).

KELLY, ROY W., Oregon City, Oreg.: Skull of a Flathead Indian. Purchase. 40720.

KENDALL, Dr. W. C. (See under U. S. Fish Commission.)

KENLY, Mrs. E. M., West End, W. Va.: Fossil shells, leaves, and ferns. 40680.

KENNEDY, Dr. JAMES S., U. S. V., Saleedo, Samar, P. I.: Specimen of Reduviid, an insect representing the species *Dungada rubra* Amyot and Serville. 39922.

KENNEDY, Prof. P. B. (See under California Academy of Sciences.)

KENNEDY, Mrs. T. L., Opelika, Ala.: Specimens of a scale insect infesting water oaks. 41210.

KENOYER, L. A., Independence, Kans.: Five plants from Kansas. 39863.

KERRISON, DAVENPORT, Jacksonville, Fla.: Spider (*Phidippus audax* Hentz). 39803.

KEW, ENGLAND, ROYAL BOTANIC GARDENS: About one thousand plants from the Philippine Islands and Guiana; 21 duplicate plates from "Refugium Botanicum" (40305); 2 living plants from Kew Gardens (40502). Exchange.

KILLEY, W. H., Cleveland, Ohio: Medal conferred by the State of New Jersey on its citizen soldiers who participated in the Spanish-American war; 21 jasper and obsidian arrow points. 40377.

KINCAID, Prof. TREVOR, University of Washington, Seattle, Wash.: Sixty-five specimens of moths. 40271. (See under Harriman Alaskan Expedition.)

KING, CYRUS A., Winona Lake, Ind.: Specimens of *Nymphæa advena* from Lake Winona. 39691.

KING, Capt. EDWARD L., U. S. A., War Department, Washington, D. C.: Iron bit from the Philippine Islands. 41110.

KING, GEORGE B., Lawrence, Mass.: Received through Dr. L. O. Howard. Nine specimens of Phyllopods representing the species *Branchipus vernalis* Verrill (?). 40736.

KING, HORATIO C., Brooklyn, N. Y.: Bronze bust of the late Hon. Horatio King, by Dunbar, a Washington sculptor. 40716.

KINGSLEY, WARREN S., Edwardsburg, Mich.: Specimen of *Viola*. 41166.

KIPPER, F. G., Newport News, Va.: Copper ore from Wall Mine, Halifax County, Va. 40717.

KIRKLAND, E. O., Baltimore, Md.: Swords and flag captured during the Civil War, 1861–1865 (40950); Colt's revolver, Walsh revolver, double-action revolver, pepper-box pistol, pair of flint-lock pistols, Hall's breech-loading carbine, and a Hall breech-loading rifle (40951). Purchase.

KIRKPATRICK, HARRY C., Meadville, Pa.: Specimens of *Nymphæa advena*. 39617.

KIRSCH, LOUIS. (See under Williamsburgh Scientific Society.)

KISHINOUYÉ, Dr. K., Imperial Fisheries Bureau, Tokyo, Japan: Three photographs of Japanese precious coral. 40230. Exchange.

KJELLMAN, Prof. F. R., Upsala, Sweden: Nine plants from Europe representing species of cultivated *Ribes*. 39913.

K. K. NATURHISTORISCHES HOFMUSEUM. (See under Vienna, Austria.)

KLAGES, E. A., Crafton, Pa.: Collection of Lepidoptera from Venezuela (purchase) (39806); specimen of wood affected with *Scolytus muticus* (gift) (40642); 48 specimens of Cicindelas from Venezuela (gift) (41175).

KNIPOWITSCH, Dr. N. (See under St. Petersburg, Imperial Academy of Sciences.)

KOCH, Miss EMMA A., Erie, Pa.: Received through J. H. KOCH. Album of dried flowers and 165 mounted photographs. 40922. Three albums of paintings on rice paper, by Chinese artists. Loan. 8423.

KOCH, J. H., Erie, Pa.: East Indian copper coins and a betelnut (40749; 40820).

KOCH, O., Sheboygan, Wis.: Fishhook and 3 fragments of pottery. Exchange. 39972.

KREAGER, FRANK O., Pullman, Wash.: Four hundred and ten plants from northern Washington. Purchase. 40514.

KUNZ, GEORGE F. (See under Frank Howland; also under Henry S. Manning.)

KUNZE, Dr. R. E., Phoenix, Ariz.: Thirteen plants from Arizona and a specimen of the fruit of *Opuntia greggii;* photograph; 3 plants from Arizona; 34 specimens of Lepidoptera, 70 specimens of Orthoptera and 2 specimens of *Busera microphylla.* (40067; 40109; 40181; 40206; 40214; 40309; 40310.)

KWIAT, A., Chicago, Ill.: Twenty-seven specimens of Lepidoptera. 40556.

LACEY, HOWARD, Kerrville, Tex.: Three skins and skulls of *Odocoileus* from Kerrville. 40846.

LACHENAND, GEORGES, Limoges, France: Sixteen specimens of Bryophyta from France (39812); 30 specimens of mosses and Hepatica from Europe (40371). Exchange.

LAHEE, F. H., Brookline, Mass.: Specimen of *Corocordulia libera* Selys. 40258.

LAMB, Dr. D. S., Army Medical Museum, Washington, D. C.: Anatomical and anthropological specimens (40921; 41066; 41133; 41159; 41215).

LAND, JOHN, Wagersville, Ky.: Chrysalis of a butterfly (*Papilio asterias* Fabr.). 39902.

LANDSBERG, FRED., Victoria, British Columbia: Antique Chilcat blanket. Purchase. L. P. X. 40526.

LANEY, F. B. (See under North Carolina Talc and Mining Company.)

LANGILLE, H. D. (See under Department of Agriculture.)

LANGLEY, Dr. S. P. (See under Smithsonian Institution; and also under Stevens Institute of Technology.)

LATCHFORD, Hon. F. R., Ottawa, Canada: Unionidæ from Canada. 39821.

LAYNE, J. E., Marco, Fla.: Plant, and a piece of pottery from near Marco Island, Florida (39912; 41132).

LEARY, J. L., superintendent, U. S. Fish Commission, San Marcos, Tex.: Botanical specimens consisting of root and seeds of *Nymphæa* (sp. nov.). 39707.

LEE, D. C., Harbor Springs, Mich.: Eleven quill baskets, floor mat, and an Indian pipe. Purchase. 39776.

LEE, W. McD., Irvington, Va.: Fossil crab from the Rappahannock River, near Chesapeake Bay. Purchase. 40341.

LEE, W. T., Trinidad, Colo.: Seventy-five specimens of Mesozoic invertebrate fossils from Colorado, Wyoming, and Mexico; Lower Silurian brachiopod small slab from Palmer Lake. 40669.

LEFROY, H. MAXWELL, Bridgetown, Barbados, West Indies: Bats, lizards, fish, mollusks, and other invertebrates from Barbados and other islands of the Lesser Antilles. 40276.

LEHMAN, J. B., Edwards, Miss.: Snake (*Haldea striatula*) from Mississippi. 41002.

LEIGHLEY, E. O., Baltimore, Md.: Sixteen fossils from Cleveland, Ohio. 39701.

LELAND STANFORD JUNIOR UNIVERSITY, Stanford University, Cal.: Crustaceans from Japan collected by Messrs. Jordan and Snyder (39698); received through Dr. David S. Jordan, president, Japanese fishes collected by the steamer *Albatross* (40524); 16 specimens (7 species) of Isopods (40908).

LE SOUËF, D., Parkville, Victoria, Australia: Birds' eggs from Australia. Purchase. 41183.

LEWIS, C. M., Reading, Pa.: Morse telegraph keys made by Clark, and by Neff. 40609.

LINDGREN, W. (See under Interior Department, U. S. Geological Survey.)

LINDSAY, Mrs. WILLIAM. (See under National Society of the Daughters of the American Revolution.)

LINN, Miss L. I., Highland, Md.: Luna moth. 41073.

LINTON, Prof. EDWIN, Washington, Pa.: Parasitic worms. 39730.

London, England, British Museum. Received through Dr. A. Smith Woodward. Four casts of jaws and teeth of Mastodons (39844); received through Oldfield Thomas; Alcoholic specimens of Bats (*Mystacina*) from New Zealand, and *Diclidurus* from Guatemala (40445). Exchange and Gift.

Long, M. C., Kansas City, Mo.: The Lansing Skull. Loan. 7915.

Loomis, Rev. H., Yokohama, Japan: Sixty specimens (48 species) of mollusks and 2 barnacles from Japan and the Loochoo Islands (40623); specimens of Coleoptera from Japan (40626).

Loper, Prof. S. Ward. (See under Interior Department, U. S. Geological Survey.)

Loubat, Duke of. (See under New York Botanical Garden.)

Loughborough, Mrs. J. H., Tenallytown, D. C.: Death tag used during the Civil War. 40942.

Lucas, F. A., U. S. National Museum: Mole (*Scalops aquaticus*), from Virginia. 39966.

Lucas, J. J., Society Hill, S. C.: Plant. 39962.

Ludington, Quartermaster-General M. I. (See under War Department.)

Lunell, Dr. J., Leeds, N. Dak.: Ten plants from North Dakota. Exchange. 39858.

Lusby, George B., Olivet, Md.: Beetle (*Dynastes tityus*). 40753.

Lycett, Edward, Atlanta, Ga.: Seven small porcelain vases and a heart-shaped porcelain dish (40008); white porcelain vase (40085); 2 small "Murrhine" vases, carved out of natural rock by Persian or Chinese workers, and afterwards glazed and fired in a kiln by the donor. (40527.)

Lynd, W. L. R. (See under Department of Agriculture.)

Lyon, M. W., Jr., U. S. National Museum: Specimens of *Nymphæa variegata*, *Nymphæa adrena* and *Castalia* from New Jersey (39723, 39740); plants from New Jersey (39780, 39811).

MacDade, Clarke, Newport News, Va.: Larva of *Lagoa opercularis*. 40090.

McBride, W. S., Marshalltown, Iowa: Three specimens of *Platyocrinus*. Exchange. 40929.

McCallum, D. M., Floresville, Tex.: Specimen of wild Plum, *Prunus glandulosa* Torr. and Gray. 40639.

McComb, G. T., Lockport, N. Y.: Specimens of Rochester shale fossils (exchange) (40850); specimens of Niagara fossils from Niagara County, N. Y. (exchange) (40901); Clinton and Niagara fossils from Lockport (exchange) (40943); 13 specimens of *Atrypa nodostriata* from the Clinton lenses near Lockport (gift) (41126).

McCormick, John, Washington, D. C.: American sporting rifle. Purchase. 40152.

McCune, Mrs. Alice, Mosier, Oreg.: Pupa of beetle (*Prionus californicus*). 39813.

McDonnell, James, Fredericksburg, Va. Received through Mr. Henry Dannehl: Specimen of *Siren lacertina*. 40404.

McGee, W J (See under Carroll, J. M.: also under Smithsonian Institution, Bureau of Ethnology.)

McGirr, Hon. T. L., municipal court, Manila, P. I.: Shells from the Philippine Islands (40040); amulet or "Anting-Anting," Chinese playing-cards; copper coins, and a book ("Amiterias") (40624).

McGregor, R. C., Museum of Natural History, Manila, P. I.: Reptiles from Hawaiian and Philippine Islands (purchase) (40911); petrel (deposit) (40019).

McKinney, R. E. B., Washington, D. C.: Three violets. 41152.

McLaughlin, A. C., Houston, Tex.: Samples of oil from Texas. Exchange. 40032.

McNeil, Mary S., St. Joseph, Mo., received through W. H. McNeil: Five unmounted photographs of Indian baskets. 40461.

McNeil, W. H. (See under Mary S. McNeil.)

Mackenzie, Kenneth K. (No address given), Mo.: Umbelliferæ from Missouri. 39660.

MACOUN, JOHN, Geological Survey of Canada, Ottawa, Canada: One hundred plants from Canada. Exchange. 40888.

MAIDEN, J. H. (See under Sydney, New South Wales, Australia.)

MALAMBER, JAMES M., Washington, D. C.: Rose-breasted grosbeak, *Zamelodia ludoviciana*. 39982.

MANNING, HENRY S., New York City, received through George F. Kunz: Gold-headed cane which belonged to the late Hon. Horace Greeley. 40596.

MANNING, MRS. M. H. (See under Department of Agriculture.)

MARSH, E. A. (See under American Waltham Watch Company.)

MARSH, Dr. W. H., U. S. M. H. S., Solomons, Md.: Badge of the U. S. Military Surgeons Meeting in Washington, D. C., in 1902 (39762); sutler's check for 5 cents, Fifth Regiment U. S. Cavalry, 1861–1865 (39942).

MARSHALL, CHARLES, Bay St. Louis, Miss., received through Andrew Allison: Four specimens of *Castalia* from Lake Shore, Miss. 39594.

MARSHALL, GEORGE, U. S. National Museum: Red squirrel, *Sciurus hudsonicus*, from Laurel, Md. (40347); 2 specimens of *Microtus* from Laurel (40568); Field mouse, *Microtus pennsylvanicus* (41077).

MARVIN, Dr. MARION F., contract surgeon, U. S. A., Talisay, Province of Batangas, P. I. Centipede. 40613.

MASON, MARCUS & Co., Worcester, Mass.: Two specimens of cocoa bean infested by a Phycitid moth, *Ephestia kuehniella*. 39900.

MASON, Prof. O. T., U. S. National Museum: Badge of the reception committee of the Thirty-sixth Annual Encampment, Grand Army of the Republic, October 6, 1902 (40459); 2 Tuscarora snow snake sticks (40710); bitterwood cup from Jamaica (40754); British half farthing, 1901 (40818); 4 photographs of megalithic monuments of Brittany (40889); "hen and nest" puzzle (41191); photograph of "Kit Carson" (41192).

MATHER, FRED, estate of, received through Mrs. W. H. Coughlin: Four diplomas awarded to Mr. Mather; gold gilt medal, Berlin, 1880; silver medal, Paris, 1879, and a copper medal, Berlin, 1880. (Bequest.) 40584.

MATHEWS, H. H., Boston, Mass.: Sample of red roofing slate from quarries in Hampton County, N. Y. 40605.

MATTHEWS, E. O. (See under Smithsonian Institution, Bureau of Ethnology.)

MATTHEWS, W. A., Caney, Tex.: Plant from Texas. 41164.

MAUDSLEY, ALFRED, London, England: Plate illustrating the ruined cities of Mexico. 40153.

MAXON, W. R., U. S. National Museum: Specimens of *Nymphæa hybrida* and *Nymphæa variegata* from Thousand Island Park, New York (39607, 39621); 309 specimens of ferns collected in central and northern New York (39757); 20 phanerogams from Virginia (40452); 2 specimens of *Cypripedium hirsutum* and *Caulophyllum thalictroides* from Fairfax County, Virginia (40457); 60 specimens of phanerogams collected on Plummers Island, Maryland (40463); 6 birds' eggs, termites, about 2,500 plants, and other natural history specimens from Jamaica (41010; 41053; 41104).

MAXON, W. R., and T. H. KEARNEY: Thirty plants collected on Plummers Island. 40460.

MAXON, W. R., and C. L. POLLARD, U. S. National Museum: Specimen of *Cypripedium hirsutum*. 40796.

MAXWELL, C. W., Lynchburg, Va.: Mississippi catfish, *Ictalurus punctatus;* also specimens of "Blazing Star," *Chamælirium luteum* (L.) A. Gray. 40962.

MAY, Capt. FREDERICK, Washington, D.C.: Spanish naval officer's chapeau and a double barreled Lafoucheux pistol. 40872.

MAY, H. B., Washington, D. C.: Officer's uniform of the United States Navy, worn in 1800. Purchase. 39934.

MEAD, Miss M. H., Washington, D. C. Received through Rev. A. G. Wilson: Ladies bicycle. 40667.

MEARNS, Dr. E. A., U. S. A., Fort Snelling, Minn., and Fort Yellowstone, Wyo.: Six specimens of *Nymphæa polysepala*, mammals, birds, reptiles, plants, and shells from Yellowstone National Park, Wyoming (39738; 40331); 66 specimens, including skins and skulls of mammals and wapiti antlers from Wyoming (40433); rabbit (*Lepus*); 77 birds' skins; natural history specimens of different kinds, principally from Fort Snelling; poisoned bullets, geological material (40567; 40894; 40968; 40976; 41099; 41145), marine shells, and crustaceans from Washington (41189); mammals and birds from Oregon (41214); nest and 4 eggs of *Junco oregonus* (41224).

MEDFORD, H. C., Tupelo, Miss.: Fossil plant from Birmingham, Ala. 39672.

MEEK, Prof. S. E. (See under Field Columbian Museum.)

MEEKER, J. C. A., Bridgeport, Conn.: Specimens of *Nymphæa variegata* from Pembroke Lake, near Bridgeport. 39688.

MEMMINGER, E. R., Flat Rock, N. C.: Three plants. 41031.

MERRIAM, Dr. C. HART, Department of Agriculture: Two Panamint Shoshone baskets. Purchase. 41186. (See also under Department of Agriculture.)

MERRIAM, Miss DOROTHY. (See under Department of Agriculture.)

MERRICK, H. D., New Brighton, Pa.: Fifty moths (40094); 40 specimens of Lepidoptera and 2 specimens of Neuroptera (40169); 25 specimens of Lepidoptera (40485).

MERRILL, Mr. E. D. (See under Bureau of Agriculture, Manila, P. I.)

MERRILL, Dr. G. P., U. S. National Museum: Two pieces of pegmatite from Auburn, Me. (39861); slabs of silicified wood from the vicinity of the National Zoological Park (40891); specimen of granite from Rowan County, N. C. (41058); fresh and weathered granite from Mount Airy, N. C. (41078); crude and ground talc from Cherokee County, N. C. (41100); geological specimens from Macon and Clay counties, N. C. (41124).

MERTENS, H. (See under Department of Agriculture.)

METCALF, Prof. M. M., Woman's College, Baltimore, Md.: Two hundred specimens of Lepidoptera from India. 40528.

MEUNIER, STANISLAS, Museum of Natural History, Paris, France: Meteorite from Tadjera, Algiers. Exchange. 39799.

MEYENBERG, E., Pecos City, Tex.: Received through Smithsonian Institution, National Zoological Park. Whip-tailed scorpion, and a specimen of *Jalus* (39767); horned toad, and larva of an insect (39659).

MEYER, Dr. A. B. (See under Dresden, Germany, Royal Zoological and Anthropological-Ethnographical Museum.)

MILLER, Prof. A. M., Kentucky State College, Lexington, Ky.: Four fossil plants from Kentucky. 39975.

MILLER, Mrs. E. P., care Gerrit S. Miller, jr., U. S. National Museum: Two specimens of Shrew-moles, *Blarina*, and 2 White-footed mice, *Peromyscus*, from Peterboro, N. Y. (39595); specimens of *Castalia tuberosa* from Little Hunting Creek, Fairfax County, Va. (39721).

MILLER, GERRIT S., jr., U. S. National Museum: Twenty-four plants from Geneva, N. Y. (39622; 39674); 3 specimens of *Allium*, plants, specimen of *Galinsoga*, 10 specimens of oaks, reptiles, mammals, birds, and plants, specimen of *Chamælirium*, 3 specimens of *Oxalis* and *Thalictrum* from Virginia (39692; 39802; 39822; 39987; 41015; 41070; 40431); 2 specimens of *Lycopodium* collected in Ontario by C. V. Ogden (40466).

MILLER, JOHN, Engineer Corps, U. S. A., Washington, D. C.: Ashes from the volcano of Mayon, Albay Province, P. I. 40547.

MILLER, MARY F., Washington, D. C.: Two plants from New York. 40108.

MILLER, O. O., Cambridge, Mass.: Two hundred and fifty-six plants collected in Venezuela. Purchase. 39726.

MILLER, Miss VIRGINIA. (See under National Society of the Colonial Dames of America.)

MILWAUKEE PUBLIC MUSEUM, Milwaukee, Wis.: Four snakes and a turtle. 39588.

MIMMACK, Miss KATHERINE, Washington, D. C.: Uniform of Capt. Charles O. Collins, consisting of a dress coat, cocked hat and plume, pair of epaulets, sword and belt, aiguillette. Loan. 7861.

MINNESOTA, UNIVERSITY OF, Minneapolis, Minn.: Seventy-two specimens of mosses from Minnesota, collected by J. M. Holzinger (exchange) (39615); 57 specimens of mosses from Minnesota, received through the Department of Agriculture (40031). (See also under Department of Agriculture.)

MISSOURI BOTANICAL GARDEN, St. Louis, Mo.: Specimen of *Echeveria* (gift) (40425); plant (exchange) (40480).

MITCHELL, Hon. J. D., Victoria, Tex.: Crustaceans (39639); received through Department of Agriculture, plant from Texas (39714); crustaceans (*Orchestia* sp., and *Apus æqualis* Packard), toad (*Bufo compactilis*) from Sarco Creek, Texas (40073); invertebrates from Texas, including *Apus æqualis* Packard, *Cypris*(?), and an alcyonarian coral; also treetoads, probably *Hyla semifasciatus* (40154); about 20 specimens (4 species) of land and freshwater shells from Mexico (40622). (See under Department of Agriculture.)

MITCHELL, R. H., Memphis, Tenn.: Specimen of Skipjack or "Blue Herring," *Pomobobus chrysochloris* Rafinesque. 41207.

MITCHELL, Dr. S. WEIR, Grand Cascapedia, Quebec, Canada: Specimen of Salmon, *Salmo salar*. 39634.

MOENKHAUS, W. J. (See under U. S. Fish Commission.)

MONTAGUE, H. C., Washington, D. C.: Kentucky B. L. carbine; Harpers Ferry musket, 1847, and Lefaucheaux pocket revolver. Purchase. 39610.

MONTAVON, W. F., Siniloan, Laguna, P. I.: Two specimens of Scarabæid beetle, *Xylotrupes dichotomus* Linnæus. 40190.

MONTELLO GRANITE COMPANY, Montello, Wis.: Received through L. T. Cross, superintendent. Cube of granite from quarries at Montello. 40104.

MONTEVIDEO, URUGUAY, MUSEO NACIONAL: Received through Louis A. de Herrera. Thirty-five paleolithic implements from Uruguay. Exchange. 40654.

MOONEY, JAMES. (See under Smithsonian Institution, Bureau of Ethnology.)

MOORE, CLARENCE B., Philadelphia, Pa.: Five plaster casts of rare forms of stone implements (39753); crania from an Indian mound in Florida (41068).

MOORE, E. N., New Orleans, La.: Salamander (*Ambystoma opacum*) from the Mississippi River. 41012.

MOORE, I. N., State Normal School, Slippery Rock, Pa.: Specimen of *Cladonia* from Pennsylvania. 40991.

MOORE, Rev. T. V., Catholic University, Washington, D. C.: Forty-eight specimens of *Myxomycetes* from near Lake George, New York. 39759.

MOOREHEAD, J. M., Greensboro, N. C.: Historical orations and photographs of monuments at Guilford battle ground. 40569.

MOOREHEAD, WARREN K., Pineville, Mo.: Two specimens of stalactite containing bones and flint flakes. 40966.

MOREIRA, CARLOS. (See under Rio Janeiro, Brazil, Museu Nacional.)

MORGAN, Dr. A. P., Preston, Ohio: Twenty-four specimens of *Myxomycetes* from Ohio. 39957.

MORREY, JOHN B., Washington, D. C.: Stone implements used by cliff-dwellers, San Juan River, Northern New Mexico. Exchange. 41121.

MORRILL, R. W., Massachusetts Agricultural College, Amherst, Mass.: Specimen of parasitic Hymenoptera. 40574.

MORRIS, E. L., Department of Agriculture: Large mass of Middle Devonic limestone with corals, brachiopods and ostracods, collected at Port Austin, Michigan (gift) (39860); 3 plants from Michigan, collected by C. K. Dodge (exchange) (40797). (See also under Department of Agriculture.)

MORRISON, DONALD P., Washington, D. C.: Native Filipino costume, Morro cannon, and a Filipino spear. Loan. 7936.

MORSE, E. O., Lorain, Ohio. Twenty-five specimens of Corniferous fossils from Johnson Island, Sandusky Bay, Ohio. Exchange. 41198.

MORSE, Heirs of S. F. B.: Received through Edward Lind Morse. Collections of personal relics of the late S. F. B. Morse (41019); costume worn by the late S. F. B. Morse when visiting the courts of Europe, received through Mrs. Franz Rummel. (41083.) Gift of the heirs, James E. F. Morse, W. G. Morse, S. F. B. Morse, E. L. Morse, S. M. Perry, and C. M. Rummel.

MORTON, Dr. HENRY, received through Henry Samuel Morton, executor, and Quincy L. Morton. The original Ramsden dividing engine and slide-rest. 40282.

MOSELEY, E. L., Sandusky, Ohio: Specimen of Leaf-nose bat from Guimaras, P. I. (gift) (40446); 405 plants from Ohio (exchange) (40732).

MOSS, WILLIAM, Ashton-under-Lyne, England: Marine and land shells. 39669.

MOWBRAY, LOUIS, St. George, Bermuda: Specimen of Moray (*Channomuræna vittata*). Gift 40105. (See under New York Aquarium.)

MOYER, S. J., Fort Grant, Ariz.: Pupa of Sphinx moth. 39834.

MULFORD, Miss F. A., Hempstead, N. Y.: Five specimens of violets from New York. 40357.

MUNROE, Miss HELEN, Smithsonian Institution: Model of mummy-case and tomb furniture. Deposit. 8007.

MURRAY, S. H., Washington, D. C.: Worm (*Gordius* sp.) 39783.

MUSEO NACIONAL. (See under Montevideo, Uruguay.)

MUSEO NACIONAL. (See under San José, Costa Rica, Central America.)

MUSEO NACIONAL. (See under Rio Janeiro, Brazil.)

MUSEUM OF COMPARATIVE ZOOLOGY, Cambridge, Mass.: Received through Dr. W. McM. Woodworth. Crabs from the Maldive Islands, collected by Alexander Agassiz (exchange) (40087); received through Dr. Walter Faxon, 21 specimens (13 species) of fresh-water Crabs (gift) (41196).

MUSEUM OF NATURAL HISTORY. (See under Paris, France.)

MYATTWAY, EMMA, Falls City, Nebr.: Chrysalis of *Papilio turnus* Linnæus. 39992.

NAST, THOMAS, Guayaquil, Ecuador: Collection of butterflies and moths. 40244.

NATAL BOTANIC GARDEN. (See under Durban, Natal, Africa.)

NATIONAL COLLATERAL LOAN AND JEWELRY COMPANY, Washington, D. C.: Pistol and revolver. Purchase. 39687.

NATIONAL MARBLE COMPANY, Murphy, N. C.: Received through A. S. Emerson. Two specimens of blue marble from quarries near Murphy. 40358.

NATIONAL SOCIETY OF THE COLONIAL DAMES OF AMERICA: Received through Miss Virginia Miller, chairman of the relic committee. Amsterdam dagger (1467), and a land grant signed by Thomas Green (8228); silver gravy boat, 2 pewter platters, and a framed photograph (8381). Loan.

NATIONAL SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION: Received through Mrs. William Lindsay. Postal card signed L. L. R. Pitkin, and a piece of Dove Mill paper (7836); received through Mrs. Lindsay and Mrs. A. L. Bulkley, Brooklyn, N. Y.: Gravy dish and cover, Japanese punch bowl and two wine glasses (8004); relic of prison ship *Jersey*, two letters and four photographs of daughters of soldiers of the Revolutionary Army, metal tray, two photographs of Ebenezer Hubbard's house, and a piece of pine from Floating Bridge (8091; 8166); fragment of wood from the Old North Church (8137); frame containing copy of "South Carolina Gazette and Country Journal" of Tuesday, November 15, 1768; frame containing twelve pieces of Continental paper money used during the Revolutionary war; "Col. William Washington's Battle Flag" in frame (illustration); frame containing autograph of Mrs. F. M. Pickens, a newspaper clipping, and a button from a military overcoat worn by General Andrew Pickens at the battle of Cowpens;

National Society of the Daughters of the American Revolution—Cont'd. framed engraving of Moultrie will; framed portrait of Mrs. Iredell; "Copy of Treaty of 1795 between the United States and Spain;" bullet used during the Revolutionary war; goblet made from a piece of an oak tree at Mount Vernon, planted by General Washington; strip of wood taken from a stool made from a piece of timber from the *Mayflower;* chip from a bench on which wounded soldiers were laid during the battle of Brandywine; bit of wood from the British man-of-war *Somerset*, which was lost off Cape Cod in 1783; four pieces of wood from Independence Hall, and a glass jar containing water from Jasper Springs (8238). Loan.

Navy Department, Washington, D. C.: Received through Rear-Admiral R. B. Bradford. Sample of volcanic dust which fell aboard the American steamship *Nevadam* (39643); models of 8 U. S. vessels, with cases and tables for same (39676); two Locust gun-carriages captured by the U. S. Army, at Santiago, Cuba, in 1898 (40039); received through Bureau of Ordnance, Rear-Admiral Charles O'Neil, chief, revolving gun (small arms) (40555); received through Bureau of Equipment, A. C. Wren, acting chief, specimen of dust which fell on the decks of the steamship *Hogarth* while in the vicinity of Cape Verde Islands (40762); received through Bureau of Equipment, Rear-Admiral R. B. Bradford, chief, 2 specimens of volcanic dust, which fell upon the deck of the steamship *Amazonense* on March 22, 1903, 190 miles to windward of St. Vincent Island, and upon the deck of the schooner *Marion Louise* on March 23, about 80 miles to windward of the same island (40910). Deposit.

Navy-Yard, Washington, D. C.: Received through Capt. E. C. Pendleton, superintendent of naval gun factory. Three photographs of revolving guns of early type. 40102.

Nelson, Charles A., Eddyville, Ky.: Collection of Indian relics from rock

Nelson, Charles A.—Continued. quarry near Eddyville. Purchase. 40283.

Nelson, C. Z., Galesburg, Ill.: Four plants from Illinois, including *Nemophila menziesii* Hook. and Arn, *Calendula officianalis* L., *Eupatorium ageratoides* and *Ambrosia trifolia* L. 40538.

Nelson, E. W., Department of Agriculture: Twenty-six plants from North America (39710); 86 plants, collected in Mexico (40756). Purchase. (See under Department of Agriculture; also under Mrs. N. M. Brown.)

Nesmith, H. M., Lone Grove, Tex.: Specimens of copper ores from Texas (40521); pecan nuts from Texas (40560).

Newcomb, H. H., Boston, Mass.: Ten specimens of *Chionobas katahdin*. 40332.

Newcomb, William, Tenafly, N. J.: Two microscopic mounts of *Polycistina*. 41093.

Newlon, Dr. W. S., Oswego, Kans.: Specimen of *Naticopsis altonensis* McChesney. 40391.

Newman, H. W., post quartermaster-sergeant, U. S. A., Fort Greble, Jamestown, R. I.: Indian baskets. Loan. 7972.

Newnes, Sir George, Wildcroft, Putney Heath, London, England (received through G. A. Boulenger, British Museum): Fishes collected by the Southern Crow expedition. 39766.

New York Aquarium, New York City: Moray (*Channomuræna vittata*), collected in Bermuda by Mr. Louis Mowbray. 40105.

New York Botanical Garden, Bronx Park, N. Y.: Two plants (exchange) (39614; 39694); 143 plants collected on the Island of St. Kitts (exchange) (39717); received through Prof. O. F. Cook, plant from St. Kitts (gift) (40061); 5 plants (exchange) (40045; 40281); 44 plants from Porto Rico and St. Kitts (exchange) (40293); plant (exchange) (40359); 150 plants from the West Indies (exchange) (40361);

New York Botanical Garden—Cont'd. 9 plants (exchange) (40426; 40489; 40490; 40501; 40515); 102 plants from Mexico, presented to the New York Botanical Garden by the Duke of Loubat (exchange) (40731); 23 plants (exchange) (40887; 40902; 41085; 41130; 41153; 41204).

Niblack, Lieut. Commander A. P., U. S. N.: Three Moorish flint-lock guns. Loan. 8119.

Nickels, John M., Cincinnati, Ohio: Types of three species of fossil bryozoan (exchange) (39696); fossils from the Rochester shales, Lockport, N. Y., and fossil bryozoans, *Callopora* (exchange) (40337); 500 specimens of Paleozoic fossils (gift) (40355).

Nixon, S. D., Baltimore, Md.: Two turtle shells, *Chelopus guttatus* (39955); stone axe, fossil shells, and a piece of petrified wood (40053); shells of a crab (*Gecarcinus ruricola* Linnæus) from Navassa Islands (40212).

Nolte, Emilio, Coyuca de Catalan, Guerrero, Mexico: Two specimens of tree cotton (39678); 9 specimens of minerals from Mexico (39953).

Noon, A. H., Nogales, Ariz.: A meteorite weighing 113 pounds, from Arispe, Sonoro, Mexico. Purchase. L. P. X. 41003.

North Carolina Talc and Mining Company, Hewitts, N. C.: Specimens of talc collected by F. B. Laney. 41111.

Norton, Ned, Colebrook, N. H.: Nickel ore (39807); sample of molybdenum from near Lexington, Vt. (40025).

O'Neil, Rear-Admiral Charles, U. S. N. (See under Navy Department.)

Oberholser, H. C., Biological Survey, Department of Agriculture: Ten birds' skins from Norway. 40517.

Ogden, C. V. (See under Gerrit S. Miller, jr.)

Ogden, Dr. H. C., Milwaukee, Wis.: Three plants from Wisconsin. 39779.

Oldroyd, Mrs. T. S., Burnett, Cal.: Marine shells from California (40435; 41037).

Olea de, Don Señor Serveriano, Montevideo, Uruguay: Miscellaneous shells and chalcedonic geodes. 40005.

Orcutt, C. R., San Diego, Cal.: Nineteen plants from California and Lower California (40723; 40826; 40886; 40903; 41023; 41026; 41076).

Orr, Lycurgus, Presto, Idaho. Bay guano from Idaho. 39880.

Osborne, A. C., Washington, D. C.: Two carvings made from peach stones. 39915.

Oslor, E. J., Alcott, Colo.: Specimen of *Molucella lævis* L., from Oracle, Ariz. 41201.

Osterhout, George E., New Windsor, Colo.: Specimen of an umbelifer from Colorado. 41025.

Owen, F. D., War Department, Washington, D. C.: Frame containing badges and cards relating to the unveiling ceremonies of the Rochambeau statue. 39885.

Owen, Mrs. M. W., Sepaculite, Panzos, Guatemala: Photographs illustrating the native arts of the wild Indian tribes in the interior of Guatemala (39881); Indian net bag (40421).

Page, L. W., Division of Roads, Department of Agriculture: Rocks consisting of various road materials. 39968.

Palmer, Dr. Edward, Washington, D. C.: Ten species of land and fresh-water mollusks, isopods from Alvarez, State of San Luis Potosi, Mexico, and an insect (gift) (40407); 296 plants from Mexico (purchase) (40495); 65 plants from Mexico (purchase) (40562); ethnological material collected in San Luis, Potosi, and San Felipe, Mexico (gift) (40581); 228 plants from Russia (purchase) (40658); fire fan (gift) (41109).

Palmer, Dr. T. S., Department of Agriculture: Turtle (*Pseudemys concinna*) from Louisiana. 40824.

Palmer, William, U. S. National Museum: Skin of Bald eagle (39984); specimen of *Pinus strobus* collected in Virginia (40455); 4 birds' skins from South Carolina aud Cuba (40474).

Palmer, W. C., Goldsboro, N. C.: Geological material. 40706.

Pan-American Exposition, Buffalo, N. Y. (See under Government Board.)

PARIS, FRANCE, ÉCOLE DES MINES: Received through Prof. Henri Douville. Specimen and two pieces of the type specimen of *Heterotrypa frondosa*, Edwards and Haime. 40557.

PARIS, FRANCE, MUSEUM OF NATURAL HISTORY: Received through Prof. E. L. Bouvier. Fresh-water crabs (41216); received through Dr. M. Boule, pieces of the type specimen of the bryozoan representing the species *Chætetes frondosus* and *Chætetes mammulatus* d'Orbigny (40417).

PARISH, S. B., San Bernardino, Cal.: Plants from California (40207, 40508).

PARKER, A. C., Bridgton, N. J.: Myriapod (*Julus*). 41211.

PARKER, CHARLES V., Trinidad, Colo.: Foot bone of camel or llama-like animal common in western territoy during the Pliocene period. 40208.

PARKER, JOHN W., Sergeant, U. S. Infantry, Tanana, Samar, Philippine Islands: Beetle. 39816.

PARKER, WILLIAM F., Montezuma, Colo.: Snow-fly, *Chionea niveicola* Dean. 40291.

PARKHURST, J. H., U. S. National Museum: Judgment of a justice of the peace, dated October, 1826. 39898.

PARKINSON, T. B., Detroit, Mich.: Silurian and Devonian fossils. Purchase. 41082.

PARRITT, H. W., London, England: Twenty-three specimens (14 species) of echinoderms and crustaceans. Exchange. 40274.

PARSONS, J. I., Colebrook, N. H.: Specimen of Bill-fish (Round White fish) *Coregonus quadrilateralis*. 40769.

PARTRIDGE, R. H., Washington, D. C.: Specimen of gold in quartz, from Orange County, Va. Purchase. 40959.

PATTERSON, Miss EMILY. (See under Egypt Exploration Fund.)

PAUMGARTEN, BARON P., Washington, D. C.: Flint-lock pistol of Austrian make. 40694.

PAYNE, E. J., Olympia, Wash.: Specimen of gypsum from Alaska. 40411.

PECK, J. Y., St. Augustine, Fla.: Eight plants from Florida. 40802.

PENDLETON, Capt. E. C., U. S. N. (See under Navy-yard, Washington, D. C.)

PENNSYLVANIA RAILROAD COMPANY, Camden, N. J.: Received through Walter Antrim. Diploma awarded by the New Jersey State Agricultural Society, 1858, for the engine "John Bull." 40511.

PERDEW, G. M., Cumberland, Md.: Two plants from the vicinity of Cumberland. 39845.

PERROW, B. B., Louisville, Ky.: Pistol of Henry Clay. Loan. 8272.

PETTIT, Miss KATHERINE, Lexington, Ky.: Three photographs illustrating the primitive life of the Kentucky mountaineers of Knott County, Ky. (40273); 12 photographs representing the process of making woollen cloth by hand in the Kentucky mountains (39796).

PEYSTER, FREDERIC J. DE. (See under St. Nicholas Society.)

PFORDTE, OTTO F., Rutherford, N. J.: Three specimens of wulfenite from Plumosa Mine, Huepac, Orizpe, Sonora, Mexico (exchange) (40919); specimens of chalcedony, paramelaconite, pectolite, and thaumasite from various localities (gift) (40953); 3 specimens of thaumasite from West Paterson, N. J. (exchange) (41097).

PHALEN, W. C., U. S. National Museum: Specimens of pyramorphite from near Patagonia, Ariz. (49668); rocks illustrating the geology of Boston Basin (40553).

PHOENIX WOOD AND COAL COMPANY, Phoenix, Ariz.: Received through Paul A. Brizard, secretary. Two Pima baskets. Purchase. L. P. X. 40633.

PICKERELL, A. J., Prescott, Ariz.: Specimen of *Agave* from Arizona. 40182.

PIERRE, Abbé, Moulins, France: Fourteen specimens of parasitic Hymenoptera. 40879.

PIKE RIVER GRANITE COMPANY, Amberg, Wis.: Two specimens of granite from quarries at Amberg. 40263.

PINYAN, A. H., Bisbee, Ariz.: Antler of deer (*Odocoileus*) from Arizona. 39792.

PIPER, C. V., Pullman, Wash.: Specimen of *Sedum* from Washington. 40033.

PITTIER, H., Director del Instituto Físico-Geográfico Nacional, San Jose, Costa Rica: Nineteen plants from Central America (gift) (40184); 228 plants from Costa Rica (gift; purchase) (40292; 40565); 156 plants from Costa Rica (purchase) (40566).

PLANK, E. N., Decatur, Ark.: Received through Department of Agriculture. Plant from Arkansas. 39939.

PLUMACHER, Hon. E., U. S. consul, Maracaibo, Venezuela: Seven photographs of Venezuelan natives (49837); received through Department of State, 2 models of Indian huts (40159).

POLING, O. C., Quincy, Ill.: Eleven specimens of rare Lepidoptera (40013); 12 specimens of Coleoptera, 22 specimens of Neuroptera, 2 specimens of Rhynchota, 6 specimens of Hymenoptera, and 71 specimens of Diptera (40594).

POLLARD, C. L., and W. R. MAXON, U. S. National Museum: Two specimens of *Cypripedium hirsutum* and *Caulophyllum thalictroides* from Fairfax County, Va. (40457); specimen of *Cypripedium hirsutum* (40796).

POOLE, RICHARD, Poolesville, Md.: Bald eagle in immature plumage. 40621.

POSTAL TELEGRAPH CABLE COMPANY, New York City: Received through William H. Baker, vice-president and general manager. Sample of the commercial Pacific cable laid between San Francisco and Honolulu. 40947.

POTING, H. G., Sausalito, Cal.: Six photographic views in Japan. 40617.

POTO, W. L. (See under Department of Agriculture.)

POTOMAC ELECTRIC POWER COMPANY, Washington, D. C.: Received through L. E. Sinclair, superintendent. Fifteen obsolete forms of arc lamps, etc. 40913.

POWELL, J. D., Archer City, Tex.: Beetle (*Dynastes tityus* L.). 39633.

PREBLE, E. A.: Man's reindeer coat. Deposit. 8328. (See also under Department of Agriculture.)

PREVER, Dr. PIETRO. (See under Turin, Italy, Royal Museum.)

PRICE, Mrs. JOHN P., Florence, Ala.: Specimen of *Thelyphonus giganteus*. 40839.

PRICE, Miss S. F., Bowling Green, Ky.: Fourteen specimens of ferns (exchange) (40004); 30 specimens, 5 species of fresh-water shells (gift) (40429).

PRIEST, B. W., Norfolk, England: Foraminifera from Jersey, England. Exchange. 39997.

PRINGLE, C. G., University of Vermont, Burlington, Vt.: One hundred and ninety-two plants and 50 seeds from Mexico (40849; 41029; 41219; 41220). Purchase. (See also under Department of Agriculture.)

PROKES, J. N., Jackson, Minn.: Specimen of calcareous tufa from Des Moines River, Jackson. Exchange. 41052.

PROUTEN, Mrs. BERTHA, Cleves, Ohio: Beetle (*Alaus oculatus* Linnæus). 39630.

PUGG, JOHN, Markleton, Pa.: Bat (*Lasiurus borealis*). 39772.

PURDON, ARTHUR, Arthur City, Tex.: Royal horned caterpillar, *Citheronia regalis*. 39598.

PURPUS, C. A., San Diego, Cal.: One hundred and eighty-four plants from California and Central America (purchase and gift) (40453; 41022). (See under T. S. Brandegee.)

QUAINTANCE, Prof. A. L., Maryland Agricultural College, College Park, Md.: Types of *Aleyrodes marlatti* Quaintance, from Java, and *Aleyrodes spinifera* Quaintance, from Japan. 40644.

RACUE, C. E., deputy minister of lands, mines, and fisheries, Quebec, Canada: Specimen of Salmon, *Salmo salar*. 40296.

RAGAN, R. M., Greencastle, Ind.: Flint-chipped arrow point. 40000.

RAIRDEN, Hon. B. D., U. S. Consul, Batavia, Java. Pair of Mouse deer obtained with the assistance of Dr. van Romburg, of the Botanic Gardens in Buitenzorg. 40434.

RALPH, Dr. W. L., U. S. National Museum: Rabbit (*Lepus americanus*) form Spruce Lake, New York (39974); 4 eggs of Black-throated Green warbler, *Dendroica virens*, from New York (40862); egg of Short-tailed hawk, *Buteo brachyurus*, from Florida (40870); nest and 4 eggs of Russet-backed thrush, *Hylocichla ustulata*, from California (40925).

RAMIREZ, JOSÉ, Mexico, Mexico: Ashes from the volcano of Santa Maria in Guatemala. 40451.

RAMSDEN, CHARLES D., Santiago, Cuba: Thirty-seven moths. 40095.

RAMSEY, N. A., Durham, N. C.: Rose gall representing the species *Rhodites bedaguaris* L. 40994.

RANSOME, F. L., U. S. Geological Survey: Specimens of lawsonite from Tiburon Peninsula, Marion County, Cal. 40779.

RAPP, SEVERIN, Sanford, Fla.: Twenty-five plants from Florida (exchange) (39693); 37 plants from Florida (gift) (39788; 40110; 40205).

RATHBUN, Mrs. RICHARD, Washington, D. C.: The "1,000" puzzle and the "15" puzzle. 40651.

READ, FRANK L., Bocas del Toro, Republic of Colombia: Sixteen species of marine shells from Colombia. 40583.

REED, E. C., Museo de Concepcion, Concepcion, Chile: Large and valuable collection of Chilean insects, including Coleoptera, Hymenoptera, and other orders, and consisting of 2,051 specimens. 40222.

REGAN, Miss GENEVIEVE, Fort Trumbull, New London, Conn.: Specimen of *Galago kirkii* (Gray) from South Africa. Purchase. 40176.

REVERCHON, J., Dallas, Tex.: Forty-two plants from Texas. (39727; 40267.)

REYNOLDS, A. J., Connersville, Ind.: Arrows and spearheads. 40270.

RHOADS, Dr. S. J., Beaver Dam, Ky.: Plant from Kentucky. 39873.

RHOADS, S. N., Audubon, N. J.: Six specimens of *Nymphæa variegata* from Clementon, N. J. (39884); specimens of *Nymphæa advena* from Haddonfield and Newton Creek, near Collingwood, N. J. (39303.)

RICHMOND, A. B., Patagonia, Ariz.: Specimens of native lead from Patagonia (39586; 39846); specimen of chalcanthite from Santa Cruz County, Ariz. (40064).

RICKER, P. L., Washington, D. C.: Six hundred and thirty-nine plants from Maine (purchase) (39695); 5 plants from Mississippi (gift) (40140); 27 plants from Maine (gift) (40239); 10 specimens of lichens and Hepatica, principally from Florida and Georgia (gift) (40449).

RICKET, C. B., New York City: Two plants from New York. 40992.

RICKSECKER, A. E., Redfield, S. Dak.: Two hundred and fifty plants from St. Croix, Dutch West Indies (purchase); 39 specimens from St. Croix (gift) (40503).

RIDDLE, L. C., Ohio State University, Columbus, Ohio: Four specimens of Hymenoptera. 40809.

RIDGWAY, ROBERT, U. S. National Museum: Twenty-one birds' skins, a bird's nest, and 2 sets of eggs, also a collection of plants (39604); skin of Great horned owl from Illinois (39986); specimen of Carolina paroquet, *Conurus carolinensis* (40518); 2 specimens of Carolina paroquets (41142).

RILEY, J. H., U. S. National Museum: Common mole (*Scalops aquaticus*) from Falls Church, Va. (40200); 2 birds' skins from Virginia (40416); skin of Great crested flycatcher, *Myiarchus crinitus* (40475); specimen of Spreading adder, *Heterodon platyrhinus*, from Falls Church (40808); 9 eggs of Wild turkey, *Meleagris galloparo silvestris*, from Fairfax County (40930); set of eggs of Cooper's hawk, *Accipiter cooperi*, from Virginia (41009).

RILEY, Prof. R. R., Louisiana, Mo.: Fossiliferous clay from the Kinderhook formation at Louisiana. 39868.

Rio Janeiro, Brazil, Museo Nacional; received through Carlos Moreira. Specimens of recent Brazilian corals. 40191.

Ritchie, J., jr., Boston, Mass.: Marine shells. Exchange. 39756.

Roberts, Charles G., Baltimore, Md.: Leaf of a South African plant representing the species *Leucadendron argentum* R. Br. (40649); specimens of Coccid, sometimes known as "ground pearls," from Cape Colony, Africa (40738).

Roberts, George E. (See under United States Mint.)

Roberts, Mrs. Percy, Monteagle, Tenn.: Plant. 39613.

Roberts, Dr. T. S., Minneapolis, Minn.: Twelve specimens of *Nymphæa variegata* from Lake Itasca, Minn. 39737.

Robertson, Prof. Charles T., Carlinville, Ill.: Nineteen species of Hymenoptera representing co-types, 4 species of Tiphiidæ, 13 species of Eumenidæ, and 2 species of Ceropalidæ. 40842.

Robinette, F. M., Cochise, Ariz.: Eighty-one birds' skins from Arizona. Purchase. 40232.

Robinson, J. H., Washington, D. C.: French bean from the District of Columbia. 39785.

Robinson, T. R., Lanham, Md.: One hundred and twenty plants collected at Thousand Isles, New York. Purchase. 39886.

Robinson, Capt. Wirt, U. S. A., West Point, N. Y.: Two skins of *Chordeiles minor* and *Blacicus pallidus*, and a bird's egg from tropical America (39969); miscellaneous insects (39971); specimen of *Papilio homerus* (40092); 100 specimens of Lepidoptera (exchange) (40269); 28 moths (40554); eggs of *Ampullaria* from Palm Beach, Fla. (40945).

Rodey, Hon. Bernard S., House of Representatives, Washington, D. C.: Sample of Manila hemp from the Philippine Islands, collected by Capt. George Curry, of Manila. 40638.

Rogers, Dr. A. F., Columbia University, New York City: Ostracode-bearing rock from the coal measures of Kansas (40418); 5 specimens of *Cyclus communis* from Kansas City, Mo. (40768).

Romburg, Dr. van. (See under Hon. B. S. Rairden.)

Roon, G. van, Rotterdam, Holland: One hundred and twenty specimens (42 species) of Coleoptera and 1 Cicada (40018); received through Dr. L. O. Howard, 55 beetles from Java, Borneo, and other localities (40170). Exchange.

Rose, A. G., Ferguson, S. C.: Pupa of a butterfly (*Papilio asterias*). 39892.

Rose, Dr. J. N., U. S. National Museum: Small Mexican basket and 20 specimens of tortilla or corn cakes. 40855.

Rousseau, Phileas, Notre Dame de Monts, Vendée, France: Nineteen trilobites, 5 specimens of *Bellerophon*, and 4 other fossils from the Siluric of France. Exchange. 39859.

Rowlee, W. W., Ithaca, N. Y.: One hundred and thirty plants from the Isle of Pines, West Indies. Purchase. 39916.

Rowley, Prof. R. R., Louisiana, Mo.: Specimen of Lower Burlington decomposed chert, containing minute fossils. 40022.

Royal Botanic Gardens. (See under Kew, London, England.)

Royal Gardens. (See under Calcutta, India.)

Royal Museum. (See under Turin, Italy.)

Royal Museum of Natural History. (See under Stockholm, Sweden.)

Royal Zoological and Anthropological-Ethnographical Museum. (See under Dresden, Germany.)

Royster, A., Suffolk, Va.: Received through J. W. Daniel, jr. Plant from Virginia. 39800.

Rudifer, Mrs. M. L., Knoxville, Tenn.: "Old Line Whig flag," used during the Henry Clay campaign at Arlington, Va., in 1840. 40083.

RUFFIN, Hon. J. N., U. S. consul, Asunción, Paraguay, South America. Native feather costumes from Paraguay (purchase; 41089; L. P. X. 41090).

RUMMEL, Mrs. FRANZ. (See under Heirs of S. F. B. Morse.)

RUMMEL, F. M., Washington, D. C.: Beetle (*Lycoptis villosa* Casey). 40843.

RUSSELL, Dr. FRANK. (See under Smithsonian Institution, Bureau of Ethnology.)

RUSSELL, Prof. ISRAEL, U. S. Geological Survey: Ethnological material, mammals, and a bird from the Eskimos of the Lower Yukon (39927); volcanic material from Cinder Buttes, Idaho (40344).

RUSSELL, WILLIAM. (See under Smithsonian Institution, Bureau of Ethnology.)

RUST, H. N. (See under Smithsonian Institution, Bureau of Ethnology.)

RYERSON, R. G., Wayne, N. J.: Wampum belt of Seneca Indians. Loan. 7892.

ST. MARY'S ACADEMY, Monroe, Mich.: Received through Sister M. Catherine. Specimens of calcite from Monroe and a specimen of celestine from Scofield. 40007.

ST. NICHOLAS SOCIETY, New York City: Received through the committee, Charles A. Schermerhorn, Frederic de P. Foster, and Frederic J. de Peyster. Medal of the St. Nicholas Society commemorating the two hundred and fiftieth anniversary of the granting of municipal government to New Amsterdam. 41067.

ST. PETERSBURG, RUSSIA, IMPERIAL ACADEMY OF SCIENCES: Received through Dr. N. Knipowitsch. One hundred and two specimens (46 species) of land and fresh-water shells from central Asia. Exchange. 41051.

SAN JOSÉ, COSTA RICA, MUSEO NACIONAL: Received through Prof. P. Biolley. Amphipods and crustaceans. (40625; 41098.)

SAMPSON, FRANK R., Woodcliffe, N. J.: Continental bill, 20 shillings, New London, 1776. 40588.

SAMSON, HENRY W., Washington, D. C.: Copper coin of Persia. 40653.

SANDERSON, Prof. E. DWIGHT, Agricultural and Mechanical College, College Station, Tex.: Hermaphrodite specimen of *Orgyia leucostigma*. 40401.

SANDHAM, HENRY, London, England. (See under Smithsonian Institution.)

SANDS, W. A., Auburndale, Fla.: Sphinx moth, *Protoparce rustica* Fabr. 39596.

SARKIS, Dr. E. D., Philadelphia, Pa.: Two pairs of Persian stockings, Persian cap, and Persian coin. 40897.

SARTORIS, Miss NELLIE GRANT. (See under Gen. F. D. Grant.)

SAUNDERS, E. E. & Co., Pensacola, Fla.: Trumpet-fish or flute-mouth, *Fistularia tabacaria*. 40509.

SAVAGE, J. G., Rosslyn, Va.: Beetle (*Copris carolina* L.). 39683.

SAVILLE, M. H. (See under Smithsonian Institution, Bureau of Ethnology.)

SAYLES, IRA. (See under Interior Department, U. S. Geological Survey.)

SCHERMERHORN, CHARLES A. (See under St. Nicholas Society.)

SCHEUBER, Miss E. W., Livingston, Mont.: Fifty-three plants from Yellowstone National Park. Purchase. 40542.

SCHILD, P., New York City: Collection of insects from Costa Rica, including Coleoptera, Hemiptera, Diptera, and Hymenoptera. Purchase. 39653.

SCHLÜTER, WILHELM, Halle-an-der-Saale, Germany: Ten mammals (purchase) (40051); cast of an egg of Moa, *Emeus craseus* (gift) (40065); 6 squirrels from Java (purchase) (40074); 14 mammals from Java (purchase) (41135); skeleton of a rabbit (purchase)t(40419); 11 mammals from New Guinea (purchase) (40670); 4 specimens of *Traguli* from Ceylon (gift) (41059).

SCHMID, E. S., Washington, D. C.: Parrot (*Amazona*) (39985); Australian ground pigeon, *Geophaps scripta* (40468); monkey (40558); nightingale (40745); Indian starling, *Temenuchus pagodarum* (41177).

SCHNECK, Dr. J., Mount Carmel, Ill.: Bat (*Corynorhinus macrotis*) (39842); 5

SCHNECK, Dr. J.—Continued.
plants from various localities in the United States (39960); specimen of *Corynorhinus macrotis* from Mount Carmel (40522).

SCHUCHERT, CHARLES, U. S. National Museum: About 100 specimens of Helderbergian material from Cumberland, Md. (39641); fossils collected in Virginia, West Virginia, and Georgia (40177).

SCHUETTE, J. H., Greenbay, Wis. (received through the Biological Society of Washington, D. C.): Thirty specimens of *Cratægus*. 41150.

SCHUSTER, ADOLF and BENJAMIN, Holbrook, Ariz.: Two masks of Hopi Indians from Walpi, Ariz. Purchase. 40056.

SCHWARZ, Dr. E. A., Department of Agriculture: Five seeds from the West Indies collected by H. G. Hubbard (40221); 53 specimens of Lepidoptera from Cuba (40867).

SCIDMORE, Miss E. R., Washington, D. C.: Pencil outlines of a human foot (40606); brass fixed ammunition case for 4-pounder gun fired from the U. S. S. *Olympia*, May 1, 1898 (40909); regulation army shoe worn during 1861–1865 (40924); 113 specimens, including ethnological material, ceramics, and religious objects from China. Loan. 8373.

SCIENTIFIC AMERICAN, New York City received through Department of Agriculture): Specimen of *Cryptostegia grandiflora* Brown, from Mexico. 39876.

SCOLLICK, W. E., U. S. National Museum: Bat (*Nycticejus*) from Oxonhill, Md. 41079.

SCOTT, T. A., Washington, D. C.: Myriapod found in a bunch of bananas. 40202.

SEALE, A. (See under Bernice Pauahi Bishop Museum, Honolulu, Hawaiian Islands.)

SEE, JAMES W. (See under Charles L. Whitaker.)

SEEGER, G. A., Branchville, Md.: Garter snake from Maryland (39895); black snake, *Zamenis constrictor*, from Branchville, Md. (40422).

SETON, E. T., Wyndygoul, Coscob, Conn.: Eleven deer from Montana. Purchase. 40938.

SETON-KARR, H. W., Wimbledon, S. W., England: Fifteen paleolithic implements from the lateritic deposits of Poondi, India. 40597.

SEYMOUR, A. B., Cambridge, Mass: Specimen of *Trichomanes petersii* from Tallulah Falls, Ga. 40640.

SHADROCK, T. T., Culpeper, Va.: Beetle (*Dynastes tityus* L.). 39636.

SHANNON, Mrs. OSBORN, Washington, D. C.: Uniform worn by the late Governor Shannon, of Ohio and Kansas, when United States minister to Mexico in 1844. 39978.

SHAW, CLARENCE H., Phoenix, Ariz.: Zuñi shirt and a collection of photographs. 40718.

SHAW, GEORGE R., Arnold Arboretum, Boston, Mass.: Fifteen plants, including pine cones, etc., from Cuba and various localities (40635; 40688).

SHAW, J. F., Somerset, Tex. (received through Department of Agriculture): Three plants (*Cucumis dipsaceus* Ehreub, and *Quercus virginiana* Mill) from Texas. 41217.

SHAW, R. E., Alberene, Va.: Burrowing snake, *Carpophis amœnus*, from Virginia. 39786.

SHECKLES, JOHN E., Washington, D. C.: Immature Osprey or Fishhawk, from Bay Ridge, Md. 39734.

SHELDON, E. P., Portland, Oreg.: Four plants from Oregon (exchange) (40114); 8 plants from California and Oregon (gift) (40214; 40402; 40448); 250 plants from Oregon (purchase) (40677); 5 plants from Oregon (gift) (40883; 41169).

SHEPHERD, T. M., Alexandria, Va.: Plants from Texas. 39793.

SHERIDAN, Mrs. IRENE RUCKER, and MICHAEL V. SHERIDAN: Trustees. Four pieces of Flemish tapestry, representing scenes in the life of Alexander the Great. Deposit. 8458.

SHERMAN, JOHN D., New York City: Twenty-three specimens (6 species) of North American beetles. 39923.

SHERWOOD, ANDREW, Mansfield, Pa.: Prehistoric stone hammer (gift) (40382); collection of Upper Devonic vertebrate and invertebrate fossils from Pennsylvania (purchase) (41123).

SHILLING, Mrs. MARY A., Washington, D. C.: Haversack and knife with cartridge-case handle carried by the late Corpl. George F. Shilling during the Cuban campaign. 39949.

SHORT, JOHN W., Liberty, Ind.: Two plants. 40592.

SHUFELDT, Dr. R. W., New York City: Two specimens of *Alaus oculatus*. 41006.

SHULAK, Rev. FRANCIS X., St. Ignatius College, Chicago, Ill.: Specimens of smoky quartz and other minerals (40368; 49960).

SHULL, GEORGE H., Havre de Grace, Md., Washington, D. C., and University of Chicago: Specimens of *Sabbatia dodocandra* (L) B. S. P., and *Pteridium aquilinum* (L) Kuhn (39899); plant from Virginia (39989); plant from New York (41114); 2 plants from New York (41131). (See under Department of Agriculture.)

SIDEBOTTOM, H., Cheadle Hume, near Stockport, Cheshire, England: Foraminifera from Great Britain and the Seychelles islands. Exchange. 39640.

SIGOURNEY, W. S., Washington, D. C.: Two hundred and thirty-one photographic views of the Philippine Islands. 40120.

SIMMONDS, H. L., Los Angeles, Cal.: Rabbit-skin blanket. Purchase. 40811.

SIMPSON, C. B., Department of Agriculture: Five butterflies from Idaho. 40868.

SIMS, CLAUDE E., Doverhill, Ind.: Eighteen pentremites. Purchase. 39789.

SINCLAIR, L. E. (See under Potomac Electric Power Company.)

SISTER M. CATHERINE. (See under St. Mary's Academy, Monroe, Mich.)

SJOSTEDT, Dr. YNGVE. (See under Stockholm, Sweden, Royal Museum of Natural History.)

SKIFF, F. J. V. (See under Field Columbian Museum.)

SKINNER, Dr. HENRY, Academy of Natural Sciences, Philadelphia, Pa.: Four specimens of *Tegrodera aloga* Skinner (cotypes). 41176.

SLATER, WILLIAM M., Washington, D. C.: Specimen of rutile from Roseland, Nelson County, Va. 39941.

SLOSSON, Mrs. A. T., Franconia, N. H.: Specimen of Dipteron (*Elachiptera formosa* Loew.), from Mount Washington, New Hampshire (40016); 28 specimens of parasitic Hymenoptera (40089); 12 specimens of parasitic Hymenoptera from Biscayne Bay, Florida (new to Museum collection) (40259).

SMITH, A. D., Peoria, Ill.: Myriapod (*Cermatia forceps* L). 41007.

SMITH, Miss ANNIE M., Brooklyn, N. Y.: Thirty specimens of mosses from North Carolina. Exchange. 41086.

SMITH, C. L., Iowa City, Iowa: Plant from Mexico. 41147.

SMITH, E. G., Arlington, Iowa: Prehistoric copper spearhead. Loan. 7833. (Returned.)

SMITH, GEORGE O. (See under Interior Department, U. S. Geological Survey.)

SMITH, HENRY, Milwaukee, Wis.: Three models of boomerangs. 40384.

SMITH, HERBERT H., Pittsburg, Pa.: Two thousand one hundred and ninety-three plants from South America. Purchase. 41206.

SMITH, JARED G., Agricultural Experiment Station, Honolulu, Hawaii. Received through Department of Agriculture: Plants from the Hawaiian Islands. (39720; 39722; 41102.)

SMITH, Prof. J. B., New Brunswick, N. J.: One hundred and nineteen slides showing parts of Lepidopteria mounted in balsam (40414); five types of Noctuids (40643.)

SMITH, Capt. J. DONNELL, Baltimore, Md.: Three hundred and seventy-five plants from Central America and the West Indies. 41048.

SMITH, L. BERTRAND, New York City.: Skull of young walrus (*Odobænus*) from Franz Josef Land. 41107.

SMITH, Mrs. RACHEL S., Lincoln, Va.: Beetle (*Desmocerus palliatus* Forster). 41047.

SMITH, THORN, Isabella, Tenn.: Meteorite-iron from the southwestern section of Cherokee County, N. C. (purchase) L. P. X. (40746); specimens of zoisite (exchange) (41095).

SMITH & WESSON, Springfield, Mass.: New military revolver. 40122.

SMITHSONIAN INSTITUTION, Mr. S. P. Langley, secretary:

Bronzed plaster bust of Cuvier. 39652. Bequeathed to the Institution by Mr. Charles Abert, through Miss Constantia Abert, Washington, D. C.

Collection of weights and measuring apparatus purchased by Mr. S. P. Langley from Mr. J. Charles Wohlbold, Nuremburg, Germany. 40029.

Bronze medal commemorating the centennial anniversary of the Athenæum of Brescia. 40973. Presented to the Institution by the Athenæum.

Original oil painting of "The March of Time." 40194. Presented by Mr. Henry Sandham, London, England.

Transmitted from the Bureau of American Ethnology, Mr. W. H. Holmes, chief.

Ancient Mexican stone yoke, received through Mr. M. H. Saville (39590); collection of relics from ruins in Arizona, collected by Mr. Cecil A. Deane, Denver, Colo. (39591); through Miss Mabel M. Gould, war bonnet obtained from a Sioux Indian and a fur bag made by the Oglala Indians (39650); received through H. E. Wadsworth, Indian war bonnet (39681); received through O. G. Hardesty, stone spearhead (39682); through Lieut. G. T. Emmons, U. S. N., Princeton, N. J., skin fur blanket obtained from the Chilcat Indians and an unfinished basket from the same tribe (39826); 50 baskets from Thompson River, British Columbia, 16 antique masks and a wooden seat from British Columbia, collected by Lieut. G. T. Emmons (39904); ethnological collection obtained by Dr. Frank Russell from the Pima Indians of Arizona (39990); collection of baskets from the Pima Indians, obtained by Dr. Frank Russell (39991); specimens of quarry site material from aboriginal quarries of Carter County, Ky., obtained by Mr. Gerard Fowke, Chillicothe, Ohio (40021); received through E. O. Matthews, collection of prehistoric stone relics (40048); baskets made by the Mission Indians, 2 pairs of yucca sandals from Santa Rosa, willow grain basket, 2 nets for carrying wild hemp, and a wooden needle, collected by Mr. H. N. Rust, Los Angeles, Cal. (40049); 90 ethnological objects from the middle West, obtained from the Indians of that section through Rev. Michael Dumarest (40071); 11 boxes containing archeological material from the shell heaps of Maine, collected by the late Frank H. Cushing (40192); 6 plastic figures of Egyptian gods, obtained through Mrs. Marie N. Buckman, Boston, Mass. (40231); ethnological material and geological specimens, collected by W J McGee, James Mooney, and others (40264); collection of pottery casts, etc. (40329); ethnological material, birds, and plants, collected by Mrs. M. C. Stevenson (40350); ethnological material, collected by Messrs. James Mooney, DeLancy Gill, A. E. Jenks, and others in Salt River Valley from among the Chippewa Indians, Cherokee Indians, and from localities in Mexico (40385); collected by Mrs. M. C. Stevenson, sun shrine containing a number of concretions, Hopi cotton kilt, embroidered and painted, to be used at the base of a white mask, tablet belonging to a plumed serpent, red pottery bowl (archaic), fragments of pottery from ruins west and northwest of Zuñi, and a fetish of Kolouise (40396); Pegan costume, obtained from William Russell, Washington, D. C. (40572); received through Mr. W. H. Holmes bronze medal of the Geographical Society of Roumania, June 15, 1900 (41016); stone implements from the West Indies, consisting of 800 specimens

SMITHSONIAN INSTITUTION—Continued.

(41087); photographs and other material pertaining to physical anthropology (41138). Deposit.

Transmitted from the National Zoological Park, Dr. Frank Baker, superintendent:

Specimen of *Tantalus loculator* (39625); monkey (*Cebus hypoleucus*); lynx (*Lynx rufus floridanus*); monkey (*Macacus maurus*); lynx (*Lynx canadensis*) (39626); specimen of *Lynx rufus*, llama; *Cebus;* specimen of *Lutra hudsonica;* specimen of *Felis leo* and *Macacus cynomolgus* (39928); specimen of nine-banded Armadillo and specimen of *Cebus* (39929); specimen of *Cebus* and a lion (39930); Lanzarotte pigeon, Great blue heron, and Bald eagle (39931); White stork and Sun bear (39932); Tasmanian wolf, *Thylacynus cinocephalus*, and Ocelot, *Felix pardalis* (39944); specimen of Nicobar pigeon (39945); Leadbeater's cockatoo (39946); boa constrictor (39947); Alligator lizard, *Scelephorus* and Glass snake, *Ophiosaurus ventralis* (40164); Prairie dog (*Cynomys ludovicianus*); Black-handed Spider monkey, *Ateles geoffroyi;* Apella monkey, *Cebus apella;* Capuchin monkey, *Cebus capucinus;* kangaroo (*Macropus*); Prong-horn antelope, *Antilocapra americana* (40165); Roseate spoonbill, *Ajaja ajaja*, and specimen of Bull snake, *Pituophis sayi* (40166); 2 Bald eagles, *Haliætus lucocephalus* (40167); buffalo (*Bison americanus*), and a specimen of *Phalangista* (40168); specimen of *Dasyprocta aguti* (40209); specimen of Hyacinthine macaw, *Anodorhynchus hyacinthinus* (40211); bittern (40252); specimen of Rocky Mountain sheep, *Ovis montana* (40253); Woodland caribou, Rangifer caribou, and skeletons of Woodland caribou and Rangifer caribou (40254); 2 specimens of American bison, *Bison americanus;* Sun bear, *Ursus malayanus;* and 3 specimens of *Felis leo;* Gray wolf, *Canis lupis griseo-albus* (40437); skin and skeleton of Red kangaroo, *Macropus rufus*, and Binturong, *Arctictes binturong* (40438); gopher snake, *Spilotes corais couperii* (40439); 3 Parson finches and a California condor, *Pseudogryphus californianus* (40440); Golden eagle, *Aquila chrysætor;* 2 specimens of Strawberry finch, 2 Painted finches and a Black duck (40441); 4 Painted finches, Gray-coated mundi, *Nasua narica*, and a boa constrictor (40442); Six-banded armadillo, *Dasypus villosus*, and a boa constrictor (40443); Java sparrow (40444); specimen of Pea-fowl, *Pavo cristatus* (40770); Black swan, King parrakeet, grouse, and Whistling swan (40771); turtle (*Chelone imbricata*); iguana (*Iguana tuberculata*); Gila monster, *Heloderma suspectum* (40772); Marsh hawk, *Circus* sp.; 2 Painted finches; White stork, *Ciconia alba*, and a Pea-fowl, *Pavo cristatus* (40773); Rocky Mountain sheep, *Ovis montana;* 2 specimens of American bison, *Bison americanus;* Prong-horn antelope, *Antilocapra americana;* Black squirrel, *Sciurus carolinensis;* Bay lynx, *Lynx rufus;* Black bear, *Ursus americanus;* Agouti, *Dasyprocta* (40774); monkey (*Cercopithecus*) (40775); Mandarin duck, *Dendronessa galericulata* (40860); Roseate spoonbill, and Hawk-bill turtle (40861); Parrakeet, Flamingo (*Phœnicopterus ruber*), Golden eagle, *Aquila chrysætor*, Loon (*Urinator imber*) (41116); Snowy owl, *Nyctea nyctea;* Mandarin duck, *Dendronema galericulata;* Parrakeet (Amazona); 2 specimens of *Phœnicopterus ruber* (41118); Spider monkey, *Ateles* (41117); kangaroo (*Macropus giganteus*); Gray wolf, *Canis lupus griseo-albus* (41115); Green heron, *Ardea virescens*, and common boa, *Boa constrictor* (41119); specimen of *Macacus cynomolgus;* Mexican Agouti, *Dasyprocta mexicana;* European porcupine, *Hystrix cristata;* Collared peccary, *Dicotyles tajaca;* Eyra cat, *Felis eyra;* and Fallow deer, *Dama vulgaris* (41120); Gray wolf, *Canis lupus griseo-albus* (41143); 2 specimens of Sandhill crane, *Grus canadensis* (41144). (See under E. Meyenberg.)

SMYTH, C. H., Hamilton College, Clinton, N. Y.: Specimens of Syracuse dyke. 40236.

SNELLING, WALTER O., Washington, D. C.: Carborundum, artificial corundum, and pencils made from artificial graphite, from the International Acheson Graphite Company, Niagara Falls, N. Y. 39958.

SNODGRASS, Prof. R. E., Washington Agricultural Experiment Station, Pullman, Wash.: Three specimens of *Palmodes morio* Hohl. 41081.

SNYDER, BLANDIN, Washington, D. C.: Three iron-pointed arrows used by Bornu negroes, Sudan. 40189.

SNYDER, J. O. (See under Leland Stanford Junior University.)

SOELNER, G. W. H., Washington, D. C.: Ten specimens (2 species) of land shells from the District of Columbia. 40589.

SOMERS, Mrs. H., Santa Barbara, Cal.: Plant from California. 40323.

SOWERBY & FULTON, London, England: Specimen of *Voluta mammilla* Gray. Purchase. 40637.

SPATH, L. (See under Department of Agriculture.)

SPENCER, A. C., U. S. Geological Survey: Two plants (fruits of cycads) from Habana, Cuba. 40499.

SPLITTSTOESER, Mr. (See under Dr. D. T. Day.)

"SPORTS AFIELD," Chicago, Ill.: Dipterous larva taken from the nasal cavity of a spike buck captured at Monterey County, Cal. 39911.

STANDINGER, Dr. A., and A. BANG-HAAS, Berlin, Germany: Seven hundred and sixty-eight butterflies and moths. Purchase. 41213.

STANTON, Dr. T. W., U. S. Geological Survey: Plant from California. 39664.

STATE DEPARTMENT. (See under Hon. E. H. Plumacher.)

STATE MUSEUM, Raleigh, N. C.: Received through Mr. H. H. Brimley. Type specimen of *Notropis brimleyi* and representatives of several other species of Cane River fishes (40336); salamanders and snakes from North Carolina (40661).

STEARNS, W. A., Atlanta, Ga.: Fossils and Unionidæ. 39647.

STEBBINS, JAMES K., Ashtabula, Ohio: Opal. Deposit. 40010.

STEELE, E. S., Department of Agriculture: Fourteen plants from the District of Columbia and Maryland. (39761; 40220.)

STEERE, J. B., Ann Arbor, Mich.: Three specimens of weasels (*Putorius*). 41013.

STEJNEGER, Miss THORA, Christiania, Norway: Forty-six mammals from Övre Eggdale, Norway (40313); 66 small mammals from Norway (41032). Purchase.

STERKI, Dr. V., New Philadelphia, Pa.: Specimens of *Branchipus* and ostracods. 40931.

STERRETT, J. A., Springland, Pierce Mill road, Washington, D. C.: Specimen of Hawkmoth, *Philampelus pandorus* Hübner (39839); 21 specimens of dragonflies from Raquette Lake, New York (40017).

STEVENS, A. F., Pond, Ark.: Four specimens of Lower Carboniferous fossils from Pond. 40303.

STEVENS, F. L., State Agricultural College, Raleigh, N. C.: Plant. 39675.

STEVENS, I. W., Cedar, Colo.: Specimens of ores. 39592.

STEVENS INSTITUTE OF TECHNOLOGY, Hoboken, N. J.: Received through Mr. S. P. Langley. Brass Barton button. 40223.

STEVENSON, Mrs. M. C. (See under Smithsonian Institution, Bureau of Ethnology.)

STEWART, Mrs. A. A., St. James, Long Island: Two specimens of beetle representing the species *Xyloryctes satyrus*. 40037.

STEWART, Frank H., Philadelphia, Pa.: Pottery fragments from Salem County, N. J. 40712.

STEWART, SAMPSON T., Little Rock, Ark.: Two valves of a species of Unio, with attached pearls. Purchase. 40079.

STILWELL, L. W., Deadwood, S. Dak.: About 700 specimens of Jurassic fossils from Wyoming and South Dakota. Purchase 39733.

Stirling, E. B., Denver, Colo.: Horned toad and eight young ones. 39894.

Stockholm, Sweden, Royal Museum of Natural History: Received through Dr. Yngve Sjöstedt. Two hundred and ninety-seven specimens of exotic Lepidoptera. Exchange. 39657.

Stoddard, H. L., Stuttgart, Ark.: Seven photographs of mound relics. 40288.

Stone, Miss Ellen, East Lexington, Mass.: Plan of Washington City, 1800, and figure of General Washington, stamped on linen. 40580.

Stotsenburg, Hon. J. H., New Albany, Ind.: Received through S. S. Gorby, Horsecave, Ky. Samples of halloysite from various localities in Hart County, Ky. 41035.

Stoy, Charles, Springvale, Va.: Stone ax found on Springvale farm, Fairfax County, Va. 41162.

Strand, Embr., Christiania, Norway: Two hundred and sixty-one specimens of Lepidoptera and 20 specimens of Orthoptera. Exchange. 40823.

Strother, John, Charlestown, W. Va.: Received through G. M. Beltzhoover, jr. Autograph note dated January 28, 1788, signed by James Rumsey. Loan. 8467.

Stroup, Miss Laura, Jamesport, Mo.: Maple leaves infested with insects. 39597.

Stuart, Dr. S. C., Washington, D. C.: Alcoholic snakes from South Africa. 41195.

Stubblefield, Mrs. Anna, Cumberland, Md.: Specimen of *Edriocrinus sacculus*, and two large segments of a crinoid column from the Oriskany of Franklin, Pendleton County, W. Va. 40505.

Sturtz, B., Bonn, Germany: Two casts of human skulls from the quaternary, near Prague. Purchase. 40403.

Suter, Henry, Auckland, New Zealand: Five specimens (five species) of marine shells from New Zealand (40548); 18 specimens of Unionidæ (40933).

Swezey, Otto H., Ohio State University, Columbus, Ohio: Eight specimens of parasitic Hymenoptera. 40552.

Sydney, New South Wales, Australia, Botanic Gardens: Received through J. H. Maiden, director. Thirty plants from New South Wales. Exchange. 40473.

Taff, J. A., U. S. Geological Survey: Specimen of *Nymphæa dealbata* (39936); specimen of *Notholæna dealbata* collected in Indian Territory (40002).

Tainter, C. S. (See under C. C. Bell.)

Tassin, Wirt, U. S. National Museum: Collection of pieces of rope made into square knots, splices, bends, hitches, etc. (40175); two diamond crystals (40873). (See under J. F. Fargo.)

Taylor, C. B., Kingston, Jamaica: Four specimens of tree-toads and a snake, from Jamaica. 40531.

Tedesche, Leon G., University of Cincinnati, Cincinnati, Ohio: Specimens of *Calymene niagarensis* Hall, from Grafton, Ill. 39589.

The Curio, Phoenix, Ariz.: Received through Paul A. Brizard. Three Apache bowl-shaped baskets. Purchase. 41056.

Thomas, Henry, Manomet, Mass.: Water-lizard, *Ambystoma maculatum*, from Massachusetts. 40689.

Thomas, Oldfield, British Museum of Natural History, London, England: Skeleton of *Lepus* and skeleton of *Pedetes;* also two skins and skulls of *Microtus* (40539); South American mammals (40665). (See under London, England, British Museum of Natural History.)

Thompson, Hugh M., St. Louis, Mo.: Pseudomorph of pyrite-galena from southwestern Missouri. 40365.

Thompson, Dr. J. C., U. S. N., Navy-yard, New York City: Fishes from the vicinity of Dry Tortugas, Florida, including *Auchenopterus*, *Malacoctenus*, *Microspathodon*, *Holocentrum*, *Elops*, and *Ogilbia*. 40601.

Thorn, A. E., U. S. National Museum: Two salamanders from Twining City, D. C. (40057; 40118).

TILDEN, J. E., University of Minnesota, Minneapolis, Minn.: One hundred plants. Purchase. 39711.

TOLLIN, O., Chakolaskee, Fla.: Three plants from Florida. 40958.

TOUMEY, J. W., Yale University, New Haven, Conn.: Two hundred and eighty plants from Arizona. 40936.

TOWNSEND, C. H., U. S. Fish Commission: Specimen of *Petaurus*, supposed to be from New Guinea. 39973.

TOWNSEND, Prof. C. H. T. (See under Department of Agriculture; also under Prof. T. D. A. Cockerell.)

TOWNSEND, J. A., received through Department of Agriculture. Twenty-seven plants collected in Oregon. 40765.

TOWNSEND-BARBER TAXIDERMY AND ZOOLOGICAL COMPANY, El Paso, Tex.: Imperial Woodpecker (39725); male specimen of Mountain Sheep, *Ovis mexicanus*, from Carrizal Mountains, Mexico (L. P. X.) (40289); through C. H. T. Townsend, president, female specimen of *Ovis mexicanus* from Carrizal Mountains (40290). Purchase.

TRACY, N. B., Auburn, Me.: Six specimens of fribolite schist from Auburn. 40693.

TRAPHAGEN, F., Bozeman, Mont.: Specimens of bismuthinite, stephanite, and corundum from Montana. Exchange. 40130.

TRASK, MRS. BLANCHE, Avalon, Cal.: Four specimens of Cotyledons from California (39852); received through Department of Agriculture, 5 plants from San Clemente Island, California (40240); 84 plants (purchase) (40610); specimen of *Tylodina fungina* Gabb (40714); 16 plants from California (40923; 41200); 4 marine shells from California (41046). (See also under Department of Agriculture.)

TRELEASE, Dr. WILLIAM, Missouri Botanical Garden, St. Louis, Mo.: Specimen of *Agave morrisi*. 39963.

TRING MUSEUM, Tring, England. (See under R. H. Beck.)

TRUE, Dr. F. W., U. S. National Museum: Plant from Maine. 39883.

TSUCHIDA, T., Zoological Laboratory, Misaki, Japan: Rodents and small mammals from Japan. (40137; 41033.) Purchase.

TURIN, ITALY, ROYAL MUSEUM: Received through Dr. Pietro Prever. Specimens of fossil Nummulites and Orbitoides. Exchange. 40256.

ULRICH, E. O., U. S. Geological Survey: About 1,250 species of Paleozoic plants, corals, echinoderms, pteropods, and crustaceans, including about 180 type lots and 10,000 specimens (purchase) (39866); meteorite from Christian County, Ky. (purchase) L. P. X. (40543); about 75,000 specimens of fossil bryozoans representing about 1,200 species, with nearly 670 types (purchase) (41179); crinoids, bryozoans, brachiopods, and trilobites, representing principally the Lower Silurian system of the Mississippi Valley (purchase) L. P. X. (41180).

UNDERWOOD, JOHN, Washington, D. C.: Spencer rifle. Purchase. 40050.

UNITED STATES MINT, Philadelphia, Pa.: Received through George E. Roberts, director. Bronze memorial medal of President McKinley, and a bronze copper medal of Lieut. Victor Blue. Purchase. 40311.

UNITED STATES NATIONAL MUSEUM: The following models were made in the Anthropological Laboratories: Plaster cast of Egyptian scarab (39765); model of a Chinese musical instrument (34749); model in plaster of a Mexican collar or yoke (39750); model of drilled ceremonial butterfly and models of a polished stone knife and a stone club (39751); model of an arghool (39825); four models of a Jouet (40072); three plaster casts of a large Mexican idol and three plaster casts of a small Mexican idol (40145); two models of the "Tower of Silence" (40158); four casts of Costa Rican metate (40234); four casts of a stone yoke from Mexico (40235); two copies of a large whistle (Spapakuilla) and a copy of a double reed (40241); model of a marine trumpet (40261); three casts of a stone yoke (40286); two casts of stone "Palmas" (40287);

United States National Museum—Continued.

four casts of "Bear Mother" (40306); Eskimo head, cast and painted (40327); four casts of Costa Rican metate (40366); four casts from sculptured sandstone block (40381); four casts of Porto Rican collar (40397); four casts of a stone collar (40549); mold and two casts of the Lansing skull (40551); four casts or carved stone metate from Nicaragua (40598); four casts of stone "God of Water" from Mexico (40599); four casts of stone head (40620); four casts of a stone head (40650); four casts of an Effigy vase (40652); four casts of a large stone metate (40656); four casts of a stone chair from Ecuador (40657); four models of Papages flute or flageolet (40761); mold and cast of marble bust of Prof. S. F. B. Morse (40777); plaster cast of wooden handle for stone hatchet from the B. E. Dodge collection (40786); copy of flute (40822); set of Seneca gambling dice (40880); two Seneca horn rattles (40865); model of a dugout canoe (40905); Sioux shot stick (40907); bowl and six dice used in the Seneca Indian gambling bone game (40916); cast of stone sculpture of a human female figure (40917); models of obsolete Seneca implements with written history of each (40939); five models of obsolete implements used by the Seneca Indians (40974); cast of human figure (40979); cast of human figure (40980); cast of human figure (40981); cast of carved stone mask (40982); cast of tripod vase (40983); cast of pipe (41064); cast of pipe (41065); cast of large obsidian cutlass (41223).

Valway, Dr. W. H., Cleveland, Ohio. Seven hundred specimens of European Coleoptera and 84 specimens of Lepidoptera. 40070.

Vanderburg, E. C., New York City: Two plants from Guatemala. 39715.

Van Deman, H. E., Washington, D. C.: Four oyster shells from Terre Bonne Bay, Louisiana. 40405.

Van Dyke, Dr. E. C., East Oakland, Cal.: Three hundred and twenty-six specimens of insects, including Diptera, Coleoptera, Hymenoptera, Lepidoptera, and other orders. 39655.

Vaughan, T. Wayland, U. S. Geological Survey: Six species of land shells from Salt Mountain, Alabama. 39593. (See under Interior Department, U. S. Geological Survey.)

Veitch, James, and Sons, Royal Exotic Nursery, Chelsea, England: Six hundred and fifty-nine plants from China. 40482.

Venable, E. P., Vernon, British Columbia: Seven specimens of Hymenoptera. 40415.

Verrill, A. H., New Haven, Conn.: Fifty specimens of Lepidoptera. 40091.

Very, C. F., Big Clifty, Ky.: Samples of asphalt from Kentucky. 40299.

Vienna, Austria, K. K. Naturhistorisches Hofmuseum: One hundred specimens of Cryptogams from Europe (39706); 115 specimens of *Kryptogamæ exsiccatæ*, Cent. VIII (40733). Exchange.

Wadsworth, H. E. (See under Smithsonian Institution, Bureau of Ethnology.)

Walcott, Hon. C. D., Director U. S. Geological Survey: Snake (*Eutænia vagrans*), from Grand Cañon, Arizona (40977); specimen of Middle Carboniferous sandstone slab with reptile tracks, collected on the Grand View trail, Grand Cañon, Arizona, by Mr. Walcott (41094). (See under Interior Department, U. S. Geological Survey.)

Walcott, Mrs. H. L. T., Claremont, Cal.: Twenty-five specimens of land-shells from California. 40750.

Walker, Dr. R. L., Carnegie, Pa.: Ferruginous concretions and geological specimens (40728; 40799).

Walling, W. P., Comer, Oreg.: Specimen of arsenopyrite, or mispickel, and arsenide of iron. 40961.

Walpole, F. A. (See under Department of Agriculture.)

Walsh, Harry, Washington, D. C.: Two fire sticks. 40506.

WALSH, Dr. JOHN, Washington, D. C.: Ten skulls and two lower jaws of Eskimos from Greenland, and a piece of a vertebra. 39976.

WAR DEPARTMENT, received through Quartermaster-General Ludington, U. S. A. Two United States Army regulation rifles (40430); received through Brig. Gen. William Crozier, chief of Ordnance Department, collection of models of obsolete ordnance and ordnance stores (40848). Deposit.

Army Medical Museum: Instruments for temporary use in physical anthropology. Loan. 8439.

WARD, CHARLES G., Rochester, N. Y.: Cast of the interior of brain cavity of the Neanderthal skull. Purchase. 40782.

WARD, H. A., Chicago, Ill.: Meteorite from Aleppo, Syria (purchase) (39940); meteorite from Baratta, New South Wales (purchase) (40069); meteorite from Gilgoin station, New South Wales (exchange) (40086); slab of a meteorite from Arispe, Sonora, Mexico (purchase) L. P. X. (40297); meteorite from Bath Furnace, Kentucky (exchange) (40587); two meteorites (exchange) (40705); meteorite from Majalahti, Finland, weighing 346 grams (exchange) (40764).

WARD, ROWLAND (LIMITED), London, England: Specimen of Norwegian elk, *Paralces* (40783); giraffe (*Giraffa*) from the northern part of Lake Baringo (40790). Purchase. L. P. X.

WARD'S NATURAL SCIENCE ESTABLISHMENT, Rochester, N. Y.: Trilobite (*Isotelus*) and a cystid from Trenton Falls, New York (39745); banded diabase dike in granite from Norway, Maine; orbicular diorite from Corsica; porphyritic diabase from Sault Ste. Marie, Canada (39848); skeleton of *Rhea*, or South American ostrich (40151); 3 specimens of quartz (L. P. X.) (40672); skin of *Platypus* and egg of *Apteryx* (L. P. X.) (40748); 11 casts of meteorites (41045). Purchase.

WARMBATH, J. S., Wilmington, Mass.: Eight adult and 6 young Greenland hares, 3 white foxes and 2 blue foxes

WARMBATH, J. S.—Continued. (40024); 5 young Arctic hares (40119). Purchase.

WARNER, W. V., Washington, D. C.: Six specimens of *Culex signifer* Coq. 40512.

WARREN, E. R., Colorado Springs, Colo.: Plants from Colorado: 26 photographs of plants. 40634.

WASHINGTON, Dr. H. S., Locust Grove, N. J.: Two specimens of iron ore. 40727.

WATERS, Dr. C. E., John Hopkins University, Baltimore, Md.: Specimen of *Corallor hiza* (39832); 3 plants from Hampton, Maryland (40185); 15 plants principally collected in Maryland (40370.)

WATKINS, W. G., Grizzly Flats, Cal.: Twenty-two ferns from California (39690; 40519; 40700.)

WEAVER, J. M., Rileyville, Va.: Specimen of Neuropteron, *Corydalus cognata* Hagen. 39815.

WEBER, J. H., Oroville, Cal.: Specimen of argentiferous-auriferous copper from Josephine County, Oregon. 40734.

WEBSTER, Prof. F. M., Urbana, Ill.: Received through Department of Agriculture. Specimens of parasitic Hymenoptera. 39818.

WEED, Prof. W. H., U. S. Geological Survey: Two specimens of Mexican pines. 40697.

WEEKS, F. B. (See under Interior Department, U. S. Geological Survey.)

WEISS, L. M., Good Hope Mine, Vulcan, Colo.: Ten specimens of native tellurium and copper telluride from Good Hope Mine. 40631.

WELLS, Mrs. JAMES H. (See under Mrs. Mary Bryson.)

WENZEL, H. W., Philadelphia, Pa.: Sixteen specimens of Coleoptera. 40012.

WESLEY, WILLIAM & SON, London, England: Graphometer and a hydrometer. Purchase. 40525.

WHEATON, Mrs. F. G. (See under Mrs. F. G. d'Nautville.)

WHEELER, W. M., University of Texas, Austin, Tex.: Ten reptiles from Texas. 40586.

WHEELER, Professor. (See under Hubert Lyman Clark.)

WHITAKER, CHARLES L., Hamilton, Ohio: Received through James W. See. Spanish hand press electrotype from Cuba. 40272.

WHITE BUFFALO, Watonga, Okla.: Cheyenne war bonnet. Purchase, L. P. X. 40544.

WHITE, Dr. C. A., Washington, D. C.: Two specimens of clover from Europe and America. 40266.

WHITE, DAVID, U. S. Geological Survey: Two specimens of ferns from Pennsylvania (39810); specimens of bituminous coal from Ohio and West Virginia (40195); 3 plants from Virginia (40367); slab of rock from Mahoning, Armstrong County, Pa. (40892); skull of Pine mouse, *Microtus pinetorum*, from Webster Springs, W. Va. (41108).

WHITMORE, Miss C. R., Richfield Springs, N. Y.: Plant. 39667.

WIDGEON, J., Maryland Academy of Science, Baltimore, Md.: Three specimens of Oriskany corals from Cumberland, Md. 40277.

WIDMEYER, G. W., Elk City, Idaho: Specimens of kaolin. 41061.

WIEBUSCH, CHARLES F., New York City: Twenty specimens (10 species) of Tertiary fossils from an asphalt mine, Mina Angela Elmira, near Bejucal, province of Habana, Cuba. 39849.

WIGHT, W. F., Washington, D. C.: Two hundred and sixty-six plants from California. 40125. (See also under Department of Agriculture.)

WILCOX, Miss ETHEL, Florahome, Fla.: Gold-framed minature of the brother of General Ripley. Loan. 8070.

WILDER, Prof. FRANK A., University of North Dakota, Grand Forks, N. Dak.: Three specimens of *Unio priscus*, and two specimens of *Campeloma producta*; also fossil plants. 40080.

WILKINSON, D. F., Montevallo, Ala.: Albino squirrel (*Sciurus*). 40751.

WILLIAMS, T. A. (See under Department of Agriculture.)

WILLIAMSBURG SCIENTIFIC SOCIETY, Brooklyn, N. Y.: Received through Louis Kirsch, president. Two specimens of cut and polished golden topaz (exchange) (39644); five cut and polished amethysts (gift) (39713.)

WILLIAMSON, Prof. E. B., Bluffton, Ind.: Six specimens of dragon flies (40530); fragments of three species of *Cambarus* from near Bluffton (39763); two specimens of Crayfish (*Cambarus blandingii acutus*) from Wells County, Ind. (40984).

WILLIS, BAILEY. (See under Interior Department, U. S. Geological Survey.)

WILMER, Col. L. WORTHINGTON, Ryde, England: One hundred and twenty-five specimens (66 species) of Tertiary fossils from Barton, England. 41212.

WILSON, Rev. G. A. (See under Miss Mary A. Mead.)

WINSBORO GRANITE COMPANY, Rion, S. C.: Two dressed cubes of granite. 40715.

WISE, A. S. (See under J. H. Bunnell & Co.)

WOHLBOLD, J. CHARLES. (See under Smithsonian Institution.)

WOLCOTT, ROBERT H., University of Nebraska, Lincoln, Nebr.: Collection of mites. 40117.

WOLTZ, GEORGE, U. S. National Museum: Tin whistle. 40088.

WOOL, J. MEDLEY. (See under Durban, Natal, Africa.)

WOOD, N. R., U. S. National Museum: Twelve birds. 39981.

WOODROW, GORDON B., Lowesville, Va.: Specimens of amethyst crystals. 39875.

WOODRUFF, Maj., C. E., U. S. A., Batangas, P. I.: Filipino fire-syringe. 40778.

WOODWARD, A. SMITH. (See under London, England, British Museum.)

WOODWARD, Dr. R. M., Washington, D. C.: Collection of mound-builders' relics. 40149.

WOODWORTH, F. A., San Francisco, Cal.: Twenty-five specimens (six species) of land-shells from California (40946); 40 specimens of *Vitrea draparnaldi* Beck, from San Francisco (41074).

WOODWORTH, Dr. W. McM. (See under Museum of Comparative Zoology.)

WOOLSON, Miss G. A., Pittsford, Vt.: Tree-frog. 39879.

WORCESTER, Hon. DEAN C., secretary of the interior, Manila, P. I.: Two hundred and seventy-nine photographs of native Filipinos. 39994.

WORTHEN, C. K., Warsaw, Ill.: Pair of Harris Cormorants (40462); Black bear, *Ursusa mericanus* (40615). Purchase. L. P. X.

WREN, CHRISTOPHER, Plymouth, Pa.: Specimen of basanite, used by Indians in making implements. 40262.

WRENN, A. C. (See under Navy Department, Bureau of Equipment.)

WRIGHT, Prof. ALBERT T., Oberlin College, Oberlin, Ohio: Two specimens of dragon-flies and a Sialid, from Japan. 40260.

WYCOFF, F. L., Port Townsend, Wash.: Received through the Department of Agriculture. Five plants from Washington. 40141.

YALE UNIVERSITY MUSEUM, New Haven, Conn.: Received through Dr. C. E. Beecher. Large slab with 18 fine

YALE UNIVERSITY MUSEUM—Continued. specimens of *Melonites* from the St. Louis limestone, at St. Louis, Mo., and 135 specimens (25 species) of Stafford limestone fossils from Leroy and Batavia, N. Y. 40648.

YEATES, W. S., Atlanta, Ga.: Geological specimens. 39869.

YOUNG, WILLIAM, Detroit, Mich.: Stone implements and a water-worn specimen of a cyathophylloid coral. Exchange. 39937.

YOUNG BROTHERS, Cartersville, Ga.: Mole cricket, *Gryllotalpa borealis* Burm. 39836.

ZALESKI, S. L., Fish Springs, Utah: Two specimens of *Yucca gilbertiana* and three other plants. (40265; 40316.)

ZEUS, CARL C., Fredalba Park, Cal.: Reptiles and insects from San Bernardino Mountains, California (40825); specimen of an orthopteron (40971).

ZOLLIKOFER, E. H., St. Gallen, Switzerland: Seventy mammal skins from Switzerland and 5 bats from Greece (41034); 102 mammals from Switzerland (40136). Purchase.

APPENDIX III.

Bibliography, 1902–3.

PUBLICATIONS OF THE MUSEUM.

ANNUAL REPORT.

Annual Report | of the | Board of Regents | of the | Smithsonian Institution, | showing | the operations, expenditures, and condition | of the Institution | for the | year ending June 30, 1900. | — | Report | of the | U. S. National Museum. | — | Washington: | Government Printing Office. | 1902.

8vo., pp. I–XVI, 1–738, pls. 122, text figs. 126.

PROCEEDINGS.

Smithsonian Institution. | United States National Museum. | — | Proceedings | of the | United States National Museum. | — | Volume XXIV. | — | Published under the direction of the Smithsonian Institution. | — | Washington: Government Printing Office. | 1902. |

8vo, pp. I–XV, 1–971, pls. 1–56, text figs. 138.

BULLETIN.

The Birds | of | North and Middle America: | A Descriptive Catalogue | of the | Higher Groups, Genera, Species, and Subspecies of Birds | known to occur in North America, from the | Arctic Lands to the Isthmus of Panama, | the West Indies and other islands | of the Caribbean Sea, and the | Galapagos Archipelago. | By | Robert Ridgway, | Curator, Division of Birds. | — | Part II. | Family Tanagridæ—The Tanagers. | Family Icteridæ—The Troupials. | Family Cœrebidæ—The Honey Creeper. | Family Mniotiltidæ—The Wood Warblers. | — | Washington: | Government Printing Office. | 1902. |

Bulletin 50, Part II, 8vo, pp. I–XX, 1–834, pls. I–XXII.

A List | of | North American Lepidoptera | and | Key to the Literature of this | Order of Insects. | By | Harrison G. Dyar, Ph. D., | Custodian of Lepidoptera, United States National Museum, | assisted by | C. H. Fernald, Ph. D., the late Rev. George D. Hulst, | and August Busck. | — | Washington: | Government Printing Office. | 1902.

Bulletin 52, 8vo., pp. I–XIX, 1–723.

REPRINT.

A Preliminary Catalogue | of the | Shell-bearing Marine Mollusks and Brachiopods | of the | Southeastern Coast of the United States, | with illustrations of many of the species. | By | William Healey Dall, A. M., | Honorary Curator Division of Mollusks, U. S. National Museum. | — | Reprint | To which are added twenty-one plates [with explanations, and a supplementary list of species] not in the edition of 1889. | — | Washington: | Government Printing Office. | 1903.

Bulletin 37, 8vo., pp. 1–232, pls. I–XCV.

CONTRIBUTIONS FROM THE UNITED STATES NATIONAL HERBARIUM.

VOLUME VIII.

Part 1. Studies of Mexican and Central American Plants. By J. N. Rose. pp. 1–55, pls. I–XII, text figs. 1–11.

Part 2. Economic Plants of Porto Rico. By O. F. Cook and G. N. Collins. pp. 57–269, pls. XIII–LX, text figs. 1–13.

Part 3. A study of Certain Mexican and Guatemalan Species of *Polypodium*. By William R. Maxon. pp. 271–280, pls. LXI, LXII.

PAPERS PUBLISHED IN SEPARATE FORM.

FROM VOLUME 25, PROCEEDINGS OF THE U. S. NATIONAL MUSEUM.

No. 1275. A list of the beetles of the District of Columbia. By Henry Ulke. pp. 1–57.

No. 1276. Some new South American birds. By Harry C. Oberholser. pp. 59–68.

No. 1277. The Casas Grandes meteorite. By Wirt Tassin. pp. 69–74, pls. I–IV.

No. 1278. A review of the Oplegnathoid fishes of Japan. By David Starr Jordan and Henry W. Fowler. pp. 75–78.

No. 1279. Descriptions of two new species of Squaloid sharks from Japan. By David Starr Jordan and John Otterbein Snyder. pp. 79–81, figs. 1, 2.

No. 1280. New diptera from North America. By D. W. Coquillett. pp. 83–126.

No. 1281. List of birds collected by William T. Foster in Paraguay. By Harry C. Oberholser. pp. 127–147.

No. 1282. The reptiles of the Huachuca Mountains, Arizona. By Leonhard Stejneger. pp. 149–158.

No. 1283. Contributions toward a monograph of the lepidopterous family Noctuidæ of Boreal North America. A revision of the moths referred to the genus *Leucania*, with description of new species. By John B. Smith. pp. 159–209, pls. V–VI.

No. 1284. A list of spiders collected in Arizona by Messrs. Schwarz and Barber during the summer of 1901. By Nathan Banks. pp. 211–221, pl. VII.

No. 1285. Observations on the crustacean fauna of the region about Mammoth Cave, Kentucky. By William Perry Hay. pp. 223–236, fig. 1.

No. 1286. The Ocelot cats. By Edgar A. Mearns. pp. 237–249.

No. 1287. A review of the trigger-fishes, file-fishes, and trunk-fishes of Japan. By David Starr Jordan and Henry W. Fowler. pp. 251–286, figs. 1–6.

No. 1288. Birds collected by Dr. W. L. Abbott and Mr. C. B. Kloss in the Andaman and Nicobar islands. By Charles W. Richmond. pp. 287–314.

No. 1289. Notes on a collection of fishes from the island of Formosa. By David Starr Jordan and Barton Warren Evermann. pp. 315–368, figs. 1–29.

No. 1290. Descriptions of the larvæ of some moths from Colorado. By Harrison G. Dyar. pp. 369–412.

No. 1291. A review of the cling-fishes (Gobiesocidæ) of the waters of Japan. By David Starr Jordan and Henry W. Fowler. pp. 413–416, fig. 1.

No. 1292. Observations on the crustacean fauna of Nickajack Cave, Tennessee, and vicinity. By William Perry Hay. pp. 417–439, figs. 1–8.

No. 1293. A review of the Blennoid fishes of Japan. By David Starr Jordan and John Otterbein Snyder. pp. 441–504, figs. 1–28.

Nos. 1294 and 1295. A new fresh-water isopod of the genus *Mancasellus* from Indiana, and a new terrestrial isopod of the genus *Pseudarmadillo* from Cuba. By Harriet Richardson. pp. 505–511, figs. 1–4 and 1–4.

No. 1296. A review of the Chætodontidæ and related families of fishes found in the waters of Japan. By David Starr Jordan and Henry W. Fowler. pp. 513–563, figs. 1–6,

No. 1297. The relationship and osteology of the Caproid fishes or Antigoniidæ. By Edwin Chapin Starks. pp. 565–572, figs. 1–3.

No. 1298. Notes on little-known Japanese fishes, with description of a new species of *Aboma*. By David Starr Jordan and Henry W. Fowler. pp. 573–576, fig. 1.

No. 1299. Cambrian Brachiopoda: *Acrotreta; Linnarssonella; Obolus;* with descriptions of new species. By Charles D. Walcott. pp. 577–612.

No. 1300. On certain species of fishes confused with *Bryostemma polyactocephalum*. By David Starr Jordan and John Otterbein Snyder. pp. 613–618, figs. 1–3.

No. 1301. The shoulder girdle and characteristic osteology of the Hemibranchiate fishes. By Edwin Chapin Starks. pp. 619–634, figs. 1–6.

No. 1302. North American parasitic copepods of the family Argulidæ, with a bibliography of the group and a systematic review of all known species. By Charles Branch Wilson. pp. 635–742, pls. VIII–XXVII, figs. 1–23.

No. 1303. A review of the Ophidioid fishes of Japan. By David Starr Jordan and Henry W. Fowler. pp. 743–766, figs. 1–6.

No. 1304. A revision of the American moths of the family Gelechiidæ, with descriptions of new species. By August Busck. pp. 767–938, pls. XXVIII–XXXII.

No. 1305. A review of the dragonets (Callionymidæ) and related fishes of the waters of Japan. By David Starr Jordan and Henry W. Fowler. pp. 939–959, figs. 1–9.

FROM VOLUME 26, PROCEEDINGS OF THE U. S. NATIONAL MUSEUM.

No. 1306. A review of the Berycoid fishes of Japan. By David Starr Jordan and Henry W. Fowler. pp. 1–21, figs. 1–4.

No. 1307. Japanese stalk-eyed crustaceans. By Mary J. Rathbun. pp. 23–55, figs. 1–24.

No. 1308. A review of the Hemibranchiate fishes of Japan. By David Starr Jordan and Edwin Chapin Starks. pp. 57–73, figs. 1–3.

No. 1309. Descriptions of new species of Hawaiian crabs. By Mary J. Rathbun. pp. 75–77, figs. 1–3.

No. 1310. Contribution to a monograph of the insects of the order Thysanoptera inhabiting North America. By Warren Elmer Hinds. pp. 79–242, pls. I–XI, text figs. 1–127.

No. 1311. Description of a new genus and 46 new species of crustaceans of the family Galatheidæ with a list of the known marine species. By James E. Benedict. pp. 243–334, figs. 1–47.

No. 1312. Synopsis of the family Veneridæ of the North American recent species. By William Healy Dall. pp. 335–412, pls. XII–XVI.

No. 1313. On the lower Devonic and Ontaric formations of Maryland. By Charles Schuchert. pp. 413–424.

No. 1314. Observations on the number of young of the Lasiurine bats. By Marcus Ward Lyon, jr. pp. 425–426, pl. XVII.

No. 1315. Note on the sea anemone, *Sagartia paguri* Verrill. By J. Playfair McMurrich. pp. 427–428, figs. 1, 2.

No. 1316. On a small collection of crustaceans from the island of Cuba. By William Perry Hay. pp. 429–435, figs. 1–3.

No. 1317. Mammals collected by Dr. W. L. Abbott on the coast and islands of northwest Sumatra. By Gerrit S. Miller, jr. pp. 437–484, pls. XVIII–XIX, 1 map.

No. 1318. Birds collected by Dr. W. L. Abbott on the coast and islands of northwest Sumatra. By Charles W. Richmond. pp. 485–524, 1 map.

No. 1319. A review of the Synentognathous fishes of Japan. By David Starr Jordan and Edwin Chapin Starks. pp. 525–544, figs. 1–3.

No. 1320. Notes on the osteology and relationship of the fossil birds of the genera *Hesperornis*, *Hargeria*, *Baptornis*, and *Diatryma*. By Frederic A. Lucas. pp. 545–556, figs. 1–8.

No. 1321. Rediscovery of one of Holbrook's Salamanders. By Leonhard Stejneger. pp. 557–558.

No. 1322. A new Procelsterna from the Leeward Islands, Hawaiian group. By Walter K. Fisher. pp. 559–563.

No. 1323. The structural features of the bryozoan genus *Homotrypa*, with descriptions of species from the Cincinnatian group. By Ray S. Bassler. pp. 565–591, pls. XX–XXV.

No. 1324. A review of the Elasmobranchiate fishes of Japan. By David Starr Jordan and Henry W. Fowler. pp. 593–674, pls. XXVI–XXVII, figs. 1–10.

No. 1325. The cerebral fissures of the Atlantic walrus. By Pierre A. Fish. pp. 675–688, pls. XXVIII–XXIX.

No. 1326. Description of a new species of sculpin from Japan. By David Starr Jordan and Edwin Chapin Starks. pp. 689–690, fig. 1.

No. 1327. On the identification of a species of eucalyptus from the Philippines. By Joseph Henry Maiden. pp. 691–692.

No. 1328. Supplementary note on *Bleekeria mitsukurii* and on certain Japanese fishes. By David Starr Jordan. pp. 693–696, pl. XXX, figs. 1–3.

No. 1329. The use of the name "torpedo" for the electric catfish. By Theodore Gill. pp. 697–698.

No. 1330. A review of the Cepolidæ or band-fishes of Japan. By David Starr Jordan and Henry W. Fowler. pp. 699–702, fig. 1.

No. 1331. A genealogic study of dragonfly wing venation. By James G. Needham. pp. 703–764, pls. XXXI–LIV, figs. 1–44.

No. 1332. A review of the Cobitidæ or loaches of the rivers of Japan. By David Starr Jordan and Henry W. Fowler. pp. 765–774, figs. 1, 2.

FROM BULLETIN 39.

Part Q. Instructions to collectors of historical and anthropological specimens. (Especially designed for collectors in the insular possessions of the United States.) By William Henry Holmes and Otis Tufton Mason. pp. [1]–[16].

PAPERS BY OFFICERS OF THE NATIONAL MUSEUM AND OTHERS, BASED WHOLLY OR IN PART UPON THE NATIONAL COLLECTIONS.

ADLER, CYRUS. [Address on museums.]

Addresses delivered at the formal opening of the Semitic Museum of Harvard University. Cambridge, 1903, pp. 14–18.

ALLEN, J. A.; BANGS, OUTRAM; EVERMANN, BARTON WARREN; GILL, THEODORE; HOWELL, ARTHUR H.; JORDAN, DAVID STARR; MERRIAM, C. HART; MILLER, GERRIT S., Jr.; NELSON, E. W.; RATHBUN, MARY J. and THOMAS, OLDFIELD. A method of fixing the type in certain genera.

Science (new series), XVI, No. 394, July 18, 1902, pp. 114–115.

When no type is indicated, but the name of an included species is used for the new generic name, that species shall be regarded as the type.

AMERICAN ORNITHOLOGISTS' UNION COMMITTEE ON NOMENCLATURE. Eleventh Supplement to the American Ornithologists' Union Check List of North American Birds.

Auk, XIX, No. 3, July, 1902, pp. 315–343.

A list of about 120 cases, involving changes of nomenclature or additions to the Check List of North American Birds, acted on by the Committee on Nomenclature at a meeting held in Washington, Apr. 17–23, 1902.

ASHMEAD, WILLIAM H. Classification of fossorial, predaceous, and parasitic wasps, or the superfamily Vespoidea. (Paper No. 6.)

Canadian Entomologist, XXXIV, July, 1902, pp. 163–166.

Treats of the family Vespidæ, which is divided into two subfamilies, the Vespinæ and the Polistinæ. In all 17 genera are tabulated.

——— Classification of the fossorial, predaceous, and parasitic wasps, or the subfamily Vespoidea. (Paper No. 7.)

Canadian Entomologist, XXXIV, Aug., 1902, pp. 203–210.

Treats of the family Eumenidæ, which is divided into four subfamilies, viz: (1) Ischnogasterinæ, (2) Discoelinæ, (3) Raphiglossinæ, and (4) Eumeninæ. The subfamily Eumeninæ is again divided into three tribes: Eumenini, Odynerini, and Alastorini. In all 38 genera are tabulated, two of which, *Micreumenes* and *Monobiella*, are new.

ASHMEAD, WILLIAM H.—Continued.

——— Classification of the fossorial, predaceous, and parasitic wasps, or the subfamily Vespoidea. (Paper No. 8.)

Canadian Entomologist, XXXIV, Sept., 1902, pp. 219–231.

Treats of the families Masaridæ and Chrysididæ. The Masaridæ are divided into two tribes, the Masarini and the Euparagini. Twelve genera are tabulated, one, *Pseudomasaris*, being new. The family Chrysididæ is divided into seven subfamilies: (1) Parnopinæ, (2) Chrysidinæ, (3) Hedychrinæ, (4) Elampinæ, (5) Allocoelinæ, (6) Cleptinæ, and (7) Ameseginæ. In all, 39 genera are tabulated, of which number two, *Pseudomalus* and *Mesitiopterus*, are new. Two new species of *Mesitiopterus*, *M. kahlii* and *M. townsendi*, are described.

——— Classification of the fossorial, predaceous, and parasitic wasps, or the superfamily Vespoidea. (Paper No. 9.)

Canadian Entomologist, XXXIV, Oct., 1902, pp. 268–272.

Treats of the family Bethylidæ which is divided into three subfamilies. The first subfamily or the Bethylinæ is then taken up, one genus, *Probethylus*, being new.

——— The Hymenopterous parasites of *Phenacoccus carallix* Cockerell.

Canadian Entomologist, XXXIV, Dec., 1902, pp. 301–302.

Lists four species of hymenopterous parasites from this coccid, two, *Blepyrus phenacocci* and *Tetrastichus blepyri*, being new. *Xanthoencyrtus nigroclavus*, the type of a new genus, is also described.

——— Classification of the fossorial, predaceous, and parasitic wasps, or the subfamily Vespoidea. (Paper No. 10.)

Canadian Entomologist, XXXIV, Dec., 1902, pp. 287–293.

Treats of the remaining subfamilies of the Bethylidæ, the Emboleminæ, and the Dryininæ; also of the family Trigonalidæ.

Mr. Ashmead places in the Emboleminæ Cameron's genus *Olixon*, which was described as a Braconid.

ASHMEAD, WILLIAM H. *Ceropales* versus *Agenioxenus*.

Ent. News, XIII, Dec., 1902, p. 318.

Refutes Mr. Verick's views that *Agenioxenus* Ashmead is synonymous with *Ceropales* Latreille.

——— Classification of the fossorial, predaceous, and parasitic wasps, or the superfamily Vespoidea. (Paper No. 11.)

Canadian Entomologist, XXXV, Jan., 1903, pp. 3–8.

Treats of the families Sapygidæ, Myzinidæ, and Scoliidæ. Four genera are tabulated in the Sapygidæ and ten genera in the Myzinidæ. The Scoliidæ are divided into two subfamilies, the Scoliinæ and the Elidinæ. Eight genera are tabulated, one, *Tetrascolia*, being new.

——— Classification of the pointed-tailed wasp, or the superfamily Proctotypoidea (I).

Journ. New York Ent. Soc., X, Dec., 1902. (Published Jan., 1903), pp. 240–247.

Mr. Ashmead divides the superfamily into eight families and tabulates the genera of the Pelecinidæ, Heloridæ, and Belytidæ. Twenty-eight genera are characterized.

——— Classification of the fossorial, predaceous and parasitic wasps, or the superfamily Vespoidea. (Paper No. 12.)

Canadian Entomologist, XXXV, Feb., 1903, pp. 39–44.

Treats of the families Tiphiidæ, Cosilidæ, and Rhopalosomidæ. In the Tiphiidæ five genera are tabulated; in the Cosilidæ nine genera are recognized, one, *Isotiphia*, being described as new. Only a single genus is known in the Rhopalosomidæ.

——— Classification of the gall-wasps and the parasitic Cynipoidea. (I.)

Psyche, X, 1903, Jan.–Feb., pp. 7–13.

Mr. Ashmead separates this superfamily into two families, the Figitidæ and the Cynipidæ. The first is then divided into six subfamilies: (1) Figitinæ, (2) Onychiinæ, (3) Anacharinæ, (4) Liopterinæ, (5) Eucoilinæ, and (6) Xystinæ. Tables for recognizing the genera of the first three subfamilies are given, in which 23 genera are tabulated, one genus, *Kiefferia*, being new.

——— [Review of] Species des Hymenopteres d'Europe et d'Algerie Les Mutillides. Par Ernest André.

Canadian Entomologist, XXXV, Feb., 1903, pp. 49–50.

Mr. Ashmead notices and reviews this work.

ASHMEAD, WILLIAM H. [Review of] Monographie des Cynipides d'Europe et d'Algerie. Par l'Abbe J. J. Kieffer.

Psyche, X, Feb., 1903, pp. 43–46.

This represents a review of this work by Mr. Ashmead.

——— Classification of the pointed-tailed wasps, or the superfamily Proctotrypoidea. (II.)

Journ. N. Y. Ent. Soc., XI, Mar., 1903, pp. 28–35.

Treats of the families Diapriidæ and Ceraphronidæ. Two subfamilies, Spilosmicrinæ and Diapriinæ, are recognized in the Diapriidæ, and 31 genera are tabulated. The Ceraphronidæ are also divided into two subfamilies, the Megaspilinæ and the Ceraphroninæ, 13 genera being tabulated.

——— Classification of the fossorial, predaceous, and parasitic wasps, or the superfamily Vespoidea. (Paper No. 13.)

Canadian Entomologist, XXXV, Apr., 1903, pp. 93–107.

Treats of the family Thynnidæ, which is divided into three subfamilies: (1) Thynnidæ; (2) Methocinæ, and (3) Rhagigasterinæ. A table of the genera of the Thynninæ is given in which 28 genera are characterized, 12 being new, namely, *Thynnidea*, *Zaspilothynnus*, *Pseudaclurus*, *Guerinius*, *Cephalothynnus*, *Hemithynnus*, *Acolothynnus*, *Pseudclephoptera*, *Pycnothynnus*, *Klugianus*, *Psammothynnus*, and *Spilothynnus*.

——— Classification of the gall-wasps and the parasitic Cynipoids, or the superfamily Cynipoidea. II.

Psyche, vol. X, Apr., 1903, pp. 59–73.

Treats of the subfamilies Liopterinæ and Encoilinæ. In the former 3 genera are tabulated, in the latter 64 genera. Nine genera, namely, *Zamischus*, *Tropideucoela*, *Promiomoera*, *Odonteucoila*, *Trissodontaspis*, *Dicucoela*, *Zaeucoela*, *Pseudeucoila*, and *Tetraplasta*, are described as new.

——— A new Oryssid from Chatham Islands, Bismarck Archipelago.

Psyche, vol. X, Apr., 1903, p. 73.

Describes *Ophrynopus schauinslandi*, new species.

——— Description of a new *Apanteles*.

Tech. Bull. New Hampshire Agric. Exp. Sta., No. 6, 1903, p. 229.

Describes *Apanteles clisiocampæ*, new sp.

——— A new genus in the Vespidæ.

Ent. News, XIV, June, 1903, p. 182.

This new genus is proposed for *Vespa doryloides* Saussure, collected by Dr. W. L. Abbott in Trong, Lower Siam.

ASHMEAD, WILLIAM H. Two new Hymenopterous parasites.

Ent. News, XIV, June, 1903, pp. 192–193.

Describes *Dryinus ormenidis* and *Cheiloneurus swezeyi*, bred by Mr. Otto H. Swezey, from *Ormenis septentrionalis*.

——— Classification of the fossorial, predaceous, and parasitic wasps, or the superfamily Vespoidea. (Paper No. 14.)

Canadian Entomologist, XXXV, June, 1903, pp. 155–158.

Treats of the subfamilies Methocinæ and Rhagigasterinæ. Eleven genera are tabulated, of which one *Andreus*, from Congo, Africa, is described as new.

——— Classification of the pointed-tailed wasps, or the superfamily Proctotrypoidea. III.

Journ. N. Y. Ent. Soc., XI, June, 1903, pp. 86–99.

Treats of the families Scelionidæ and Platygasteridæ. The Scelionidæ are divided into four subfamilies: (1) Telenominæ, (2) Bæinæ, (3) Teleasina, and (4) Scelioninæ. Forty-one genera are tabulated, *Cacellus* being a new name for *Cacus* Riley, which is preoccupied. The Platygasteridæ are divided into two subfamilies: (1) Inostemminæ and (2) Platygasterinæ. Twenty-five genera are tabulated.

——— Some new genera in the Cynipoidea.

Proc. Ent. Soc. Wash., V, 1903, pp. 221–222.

In this paper Mr. Ashmead briefly describes the 9 new genera indicated in Psyche, viz: *Kiefferiella*, *Zamischus*, *Tropideucoila*, *Promiomera*, *Odonteucoila*, *Trissodontaspis*, *Dieucoela*, *Zæucoila*, and *Pseudeucoila*.

——— Description of a new genus in the Pireninæ.

Indian Museum Notes, Calcutta, India, V, 1903, pp. 61–62.

Describes *Eurycephalus alcocki*.

——— The Homoptera of Alaska.

The Harriman Expedition, pp. 129–137.

Gives a list of the species found in Alaska and describes several new species.

BAILEY, FLORENCE MERRIAM. Handbook of Birds | of the | Western United States | including | the Great Plains, Great Basin, Pacific Slope, | and Lower Rio Grande Valley | By Florence Merriam Bailey | With thirty-three full-page plates by Louis Agassiz Fuertes | and over six hundred cuts in the text | [Vignette] | Boston and New York | Houghton, Mifflin and Company | The Riverside Press, Cambridge | 1902.

12mo., pp. i–xc+1–512.

A systematic treatise of the birds of the Western United States, with brief descriptions of the various species, their nests and eggs. The work is furnished with keys to the higher groups, as well as to the genera and species. Several local lists are included, and extended biographical notices of the more interesting species are given.

BANGS, OUTRAM. Description of a new thrush from Chiriqui.

Proc. New England Zoöl. Club, III, Oct. 10, 1902, pp. 91–92.

Merula leucauchen cnephosa is a new subspecies from the Volcan de Chiriqui.

——— A new race of *Scotothorus veræpacis* from Chiriqui.

Proc. New England Zoöl. Club, III, Feb. 6, 1903, pp. 103–104.

A new subspecies of *Scotothorus veræpacis* from Divala, Chiriqui, is described as *S. v dumicola*.

——— Description of a new subspecies of *Manacus candei* (Parzud.).

Proc. New England Zoöl. Club, III, Feb. 6, 1903, pp. 105–106.

Manacus candei electilis is described as a new subspecies from Ceiba, Honduras.

——— A new race of *Vireosylva josephæ* from Chiriqui.

Proc. New England Zoöl. Club, IV, Mar. 24, 1903, pp. 9–10.

Vireo josephæ chiriquiensis (p. 9) is described as new.

——— (See also under J. A. ALLEN.)

BANKS, NATHAN. New genera and species of Acarians.

Canadian Entomologist, July, 1902, p. 171–176, 4 figs.

Describes two new genera, and eight new species. Three other genera are new to the country.

——— Notes on entomology.

Science (new series), July 25, 1902, pp. 154–156.

Reviews various recent papers.

——— The common spiders of the United States.

Canadian Entomologist, Aug., 1902, p. 218.

Reviews this book by Prof. J. H. Enerton.

——— A list of spiders collected in Arizona by Messrs. Schwarz and Barber during the summer of 1901.

BANKS, NATHAN—Continued.

Proc. U. S. Nat. Mus., XXV, No. 1284, Sept. 10, 1902, pp. 211–221, pl. VII.

New species: *Prosthesima barberi*, *Marpissa albopilosa*, *Discopoma hirsuta*.

——— A new Phalagid from the Black Mountains, N. C.

Journ. N. Y. Ent. Soc., Sept., 1902, p. 142.

Describes *scotolemon brunnea*.

——— Daddy longlegs from Mt. Katahdin, Maine.

Ent. News, Dec., 1902, p. 308.

A record of five species.

——— Sleeping habits of certain Hymenoptera.

Journ. N. Y. Entom. Soc., Dec., 1902, pp. 209–214, 1 fig.

Treats of the sleeping habits of some fossorial wasps and bees.

——— An application of the law of priority.

Science (new series), Jan. 16, 1903, p. 115.

——— Notes on entomology.

Science (new series), Jan. 23, 1903, pp. 154–155.

Notes on recent literature.

——— Secondary sexual characters in spiders.

Proc. Ent. Soc. Wash., V, No. 2, pp. 104–107. Feb., 1903.

A consideration of the possible uses of the various secondary sexual characters in spiders of the United States.

——— New Smynthuridæ from the District of Columbia.

Proc. Ent. Soc. Wash., V, No. 2, Feb., 1903, pp. 154–155.

Description of three new species.

——— A new genus of Solfugida.

Ent. News, Mar., 1903, pp. 78–79, 1 fig.

Description of *Hemerotrecha californica*, new genus and species.

——— Those manuscript names.

Science (new series), Mar. 27, 1903, p. 506.

A reply to articles by Professors Bather and Cockerell.

——— Notes on Brachynemuri of the *B. ferox* group.

Proc. Ent. Soc. Wash., V, No. 3, Mar., 1903, pp. 173–177, 1 pl.

Synopsis of the group and description of 3 new species.

——— A revision of the Neatctic Chrysopidæ.

Trans. Amer. Ent. Soc., XXIX, Apr., 1903, pp. 137–162.

Monographic treatment of the 55 species, describing 2 new genera and 7 new species.

BANKS, NATHAN. Neuropteroid insects of Arizona.

Proc. Ent. Soc. Wash., V, No. 4, Apr., 1903, pp. 237–245, 1 pl.

Annotated list of the species with descriptions of 1 new genus and 10 new species.

——— Notes on *Ceria willistoni* Kahl.

Proc. Ent. Soc. Wash., V, No. 4, June, 1903, p. 310.

A record of the occurrence of this species near Washington, D. C.

——— Notes on entomology.

Science (new series), June 19, 1903, pp. 982–983.

Reviews of several recent papers.

BARTSCH, PAUL. A new land shell from California.

Proc. Biol. Soc. Wash., XVI, June 25, 1903, pp. 103–104.

In this paper *Sonorella wolcottiana* is described as new. The specimens were collected by Mrs. H. L. T. Wolcott, of Dedham, Mass., at Palm Springs, San Diego County, Cal. The type and a fine series are entered as No. 170007, U. S. N. M. The species is named in honor of Mrs. Wolcott.

——— (See also under WILLIAM HEALEY DALL.)

BASSLER, RAY S. The structural features of the bryozoan genus *Homotrypa*, with descriptions of species from the Cincinnatian group.

Proc. U. S. Nat. Mus., XXVI, No. 1323, Mar. 28, 1903, pp. 565–591, pls. 20–25.

In this paper the genus *Homotrypa* is fully discussed with 26 species, of which 19 are either new species or varieties.

BENEDICT, JAMES E. Description of a new genus and 46 new species of crustaceans of the family Galatheidæ, with a list of the known marine species.

Proc. U. S. Nat. Mus., XXVI, No. 1311, Dec. 29, 1902, pp. 243–334, 47 text figs.

Based chiefly on material obtained by the U. S. Fish Commission steamer *Albatross* during the last twenty years. Artificial keys are given for the species examined.

BOWDISH, B. S. Birds of Porto Rico.

Auk, XIX, No. 4, Oct., 1902, pp. 356–366; XX, No. 1, Jan., 1903, pp. 10–23.

Notes on 91 species collected or observed in Porto Rico by the writer, with a supplementary list of 70 additional species recorded by others.

BREWSTER, WILLIAM. Birds of the Cape Region of Lower California.

Bull. Mus. Comp. Zool., XLI, No. 1, Sept., 1902, pp. 1–241, with one map.

A complete account of the avifauna of the

BREWSTER, WILLIAM—Continued.

Cape region of Lower California, based largely on the author's collection.

Totanus melanoleucus frazari (p. 65), *Megascops xantusi* (p. 93), *Bubo virginianus elachistus* (p. 96), and *Tachycineta thalassina brachyptera* (p. 167) are described as new, and many species are recorded for the first time from the Cape region. A full bibliography accompanies the paper.

BUSCK, AUGUST. Notes on the Cerostoma group of Yponomeutidæ with descriptions of new North American species.

Journ. N. Y. Ent. Soc., XI, No. 1, Mar., 1903, pp. 45–59.

——— Notes on Brackenridge Clemens types of *Tineina*.

Proc. Ent. Soc. Wash., V, No. 3, Apr. 3, 1903, pp. 181–220.

——— Dimorphism in the codling moth (*Cydia pomonella simpsonii*, n. var.).

Proc. Ent. Soc. Wash., V, No. 3, Apr. 3, 1903, pp. 235–236.

——— A revision of the American moths of the family Gelechiidæ, with descriptions of new species.

Proc. U. S. Nat. Mus., XXV, No. 1304, May 9, 1903, pp. 767–938, pls. XXVIII–XXXII.

New genera: *Paralechia*, *Neodactylota*, *Deoclona*, *Prostomeus*.

New species: *Paltodora magnella*, *P. dietziella*, *P. anteliella*, *Telphusa betulella*, *Aristotelia bifasciellia*, *A. argentifera*, *A. cockerella*, *A. kearfottella*, *A. quinquepunctella*, *Recurvaria colubrinæ*, *R. cratægella*, *R. nigra*, *Trypanisma fagella*, *Epithectis sylvicolella*, *Gnorimoschema baccharisella*, *G. semicyclionella*, *G. dudiella*, *G. florella*, *G. banksiella*, *G. batanella*, *G. tetradymiella*, *Neodactylota barberella*, *Deoclona yuccasella*, *Prostomeus brunneus*, *Aproærema kearfottella*, *Anacampsis cyclella*, *A. paltodoriella*, *Gelechia arizonella*, *G. coloradensis*, *G. trophella*, *G. dentella*, *G. sistrella*, *G. abdominella*, *G. paulella*, *G. unifasciella*, *G. aristella*, *G. striatella*, *G. hibiscella*, *G. cockerelli*, *G. variabilis*, *G. barnesiella*, *G. limdenella*, *G. dyariella*, *G. nigrimaculella*, *G. serotinella*, *G. panella*, *G. abella*, *Trichotaphe fernaldella*.

New name: *Autoneda*.

——— On the generic name of the codling moth.

Journ. N. Y. Ent. Soc., XI, No. 2, June, 1903, pp. 106–111.

——— (See also under H. G. DYAR.)

CASANOWICZ, I. M. The collection of oriental antiquities in the United States National Museum.

Journ. Am. Oriental Soc., XXIII, 1902, pp. 44–47.

The article gives a summary description of

CASANOWICZ, I. M.—Continued.

of the contents and the arrangement of the several sections of the divisions of historical antiquities and historic religions in the U. S. National Museum.

——— Die Irtysch-Ostjaken und ihre Volkspoesie.

Am. Anthropologist (new series), vol. 4, 1902, pp. 295–298.

Review and extracts of S. Patkanov's work of the same title, with especial reference to the state of mental culture and religious beliefs and customs among that people.

——— Jewish ceremonial objects in the United States National Museum.

Jewish Comment, XVI, 1903, pp. 5–6, with 1 pl.

Description of objects illustrating Judaism, especially from North Africa, which recently came to the Museum.

——— Parsee religious ceremonial objects in the United States National Museum.

Am. Anthropologist (new series), vol. 5, 1903, pp. 71–75, with 2 pls.

The article gives a review of the history and the fundamental beliefs, and of the sacred scriptures of the Parsees, and a description of the collection at the Museum.

CHAPMAN, FRANK M. List of birds collected in Alaska, by the Andrew J. Stone Expedition of 1901.

Bull. Am. Nat. Hist., XVI, Aug. 18, 1902, pp. 231–247.

A list of 68 species collected in Alaska, with the collector's field notes. *Lagopus leucurus peninsularis* (p. 236), and *Cyanocitta stelleri borealis* (p. 240) are described as new subspecies, and critical remarks are offered on the *Parus hudsonicus* group of chickadees.

CLARK, AUSTIN H. The birds of Margarita Island, Venezuela.

Auk, XIX, No. 3, July, 1902, pp. 258–267.

An account of 57 species observed by the author during a short visit to Margarita Island. Two species are described as new, viz, *Synallaxis albescens nesiotis* (p. 264), and *Icterus xanthornus heliocides* (p. 265).

CLARK, HUBERT LYMAN. The water snakes of southern Michigan.

Am. Naturalist, XXXVII, Jan., 1903, pp. 1–23.

Considers the red-bellied water snake of southern Michigan to be identical with *Natrix erythrogaster* and distinct from *N. sipedon*. On pages 20–21 special reference is made to the specimens borrowed from the U. S. National Museum.

COCKERELL, THEODORE D. A. (See under CHARLES LOUIS POLLARD.)

COLLINS, G. N. (See under O. F. COOK.)

COOK, O. F., and COLLINS, G. N. Economic plants of Porto Rico.

Contrib. U. S. Nat. Herb., VIII, Part 2, June 27, 1903, pp. 57–269, pls. XIII–LX, text figs. 1–13.

COQUILLETT, D. W. New diptera from North America.

Proc. U. S. Nat. Mus., XXV, No. 1280. Sept. 12, 1902, pp. 83–126.

New genera: *Meigeniella*, *Paradmontia*, *Pseudapinops*.

New species: *Orimarga arizonensis*, *Culex bimaculatus*, *C. fletcheri*, *C. squamiger*, *Ceratopogon glaber*, *C. inermis*, *C. exilis*, *C. stigmalis*, *C. pilosis*, *C. ancorus*, *C. bellus*, *C. squamipes*, *Heteromyia prattii*, *Tanypus stellatus*, *T. discolor*, *T. algens*, *T. barberi*, *T. venustus*, *T. pallens*, *T. occidentalis*, *T. guttularis*, *Orthocladius clepsydrus*, *O. platypus*, *O. politus*. *Cricotopus varipes*, *Chironomus pulchripennis*, *C. varipennis*, *C. atrimanus*, *C. palliatus*, *Bibio tenuipes*, *Scatopse varicornis*, *Simulium fulvum*, *S. virgatum*, *S. glaucum*, *Aochletus obscurus*, *Euparyphus tahoensis*, *E. apicalis*, *E. crucigerus*, *E. atriventris*, *E. amplus*, *Bombylius recurvus*, *Geron sigma*, *Pseudatrichia flaviceps*, *P. pilosa*, *Mythicomyia scutellata*, *M. pictipes*, *Rhamphomyia albata*, *Cutcrebra histrio*, *Meigeniella hinei*, *Admontia limata*, *Paradmontia brevis*, *Nexra longicornis*, *Chætophelps polita*, *Pelatachina limata*, *Pseudapinops nigra*, *Hyalomyodes dorsalis*, *Oestrophasia calva*, *O. setosa*, *Exoristoides harringtoni*, *Exorista trisctosa*, *Nemoræa setigera*, *Phorocera sternalis*, *Frontina setipes*, *Sturmia limata*, *S. austrina*, *S. discalis*, *Masicera polita*, *Euthera bicolor*, *Muscopteryx tibialis*, *M. obscura*, *Phorichæta cincrosa*, *Brachycoma pubicornis*, *B. setosa*, *Gædiopsis cockerellii*, *G. facialis*, *G. ocellaris*, *Paraphyto sarcophagina*, *Meriania chalybæa* *Amobia aurata*, *Gymnomma quadrisctosa*, *Myocera bivittata*, *Megaparia flaveola*, *Chætona flavipennis*, *Phaonia pallidula*, *Mydæa flavicornis*, *Chirosia capito*, *Pselaphephila similis*, *Calobata vittipennis*, *Spilographa fractura*.

COUTIÈRE, H. Sur quelques espèces nouvelles du genre *Automate* de Man.

Bull. Mus. Hist. Nat. Paris, 1902, No. 5, pp. 337–342.

Three species are described, *A. gardineri*, *A. talismani*, and *A. rugosa*. The last is from the U. S. Fish Commission steamer *Albatross* dredgings in the Bay of Panama; *A. gardineri* is from Kingsmill Island.

CURRIE, ROLLA P. Myrmeleonidae from Arizona.

Proc. Ent. Soc. Wash., V. No. 4, pp. 272–284.

Author's extras of this paper were published June 13, 1903.

The paper consists of a list of the species of ant-lion flies occurring in Arizona, compiled from previous published records and from the material in the U. S. National Museum, the American Entomological Society collection, and in the collections of Mr. Nathan Banks and Mr. Charles C. Adams. Thirty species and two varieties are enumerated, of which number 7 species and two varieties are described as new. Three of the new species are from the collection made by Messrs. Schwarz and Barber in 1901. All of the types are in the U. S. National Museum.

CURRIE, ROLLA P.—Continued.

——— The Odonata collected by Messrs. Schwarz and Barber in Arizona and New Mexico.

Proc. Ent. Soc. Wash., V, No. 4, pp. 298–303.

Author's extras were published June 13, 1903.

This is a report upon a collection of dragon flies made during the summer of 1901. Twenty-four species and two varieties are listed. One new species is described and is named *Ischnura barberi*. The male appendages of *Ischnura damula* Calvert and *I. barberi* are figured. All of the specimens are in the U. S. National Museum.

DALL, WILLIAM HEALEY. Reports of the Princeton University expeditions to Patagonia. Palæontology, Part II. Tertiary Invertebrates, by A. E. Ortmann, Ph. D.

Science (new series), XVI, No. 394, July 18, 1902, pp. 111–112.

A review of Doctor Ortmann's monograph of the Tertiary Invertebrates of Patagonia.

——— Letter to the editor.

Science (new series), XVI, No. 395, July 25, 1902, pp. 150–151.

A letter discussing views on nomenclature in zoology expressed in a previous article by Dr. O. F. Cook.

——— Dr. J. G. Cooper.

Science (new series), XVI, No. 398, Aug. 15, 1902, pp. 268–269.

Obituary notice of the late Dr. J. G. Cooper, for many years a collaborator of the Smithsonian Institution.

——— New species of Pacific coast shells.

Nautilus, XVI, No. 4, Aug., 1902, pp. 43–44.

Trivia atomaria, *T. panamensis*, and *Erato oligostata* from Panama Bay; *Cyclinella singleyi* from the Gulf of California, and the genus *Cyclinella*, which represents *Mysia* (of Europe) in American waters, are described as new.

——— A question of nomenclature.

Revue critique de Paléozoologie, VI, Oct., 1902, pp. 223–224.

Letter to the editor favoring the view that names of masculine and feminine terminations, otherwise similar, should not be regarded when employed for different genera, as liable to be superseded on that account.

DALL, WILLIAM HEALEY. Note on viviparity in Corbicula and Cardita.

Science (new series) XVI, No. 410, Nov. 7, 1902, pp. 743–744.

Notes the discovery in *Corbicula* from Uruguay and *Venericardia* from Alaska of a large number of well-developed young shells in the atrium of the oviduct of gravid females. [Included in a notice of the Proceedings of the Bibliogical Society of Washington, meeting of Oct. 28, 1902.]

——— Note on *Neocorbicula* Fischer.

Nautilus, XVI, No. 7, Nov., 1902, pp. 82–83.

Note on the discovery of large numbers of nepionic young shells in the atrium of the maternal ovary of *Neocorbicula*.

——— Jack London's local color.

New York Times Saturday Review, VII, No. 49, Dec. 6, 1902, VIII, No. 2, Jan. 10, 1903.

A criticism of the supposed "local color" of the ethnology of the publications of a popular writer on Alaska.

——— The Grand Gulf formation.

Science (new series) XVI, No. 415, Dec. 12, 1902, pp. 946–947.

An attempt to clear up some of the confusion which has been caused in geological literature by the recent use of the name "Grand Gulf" to designate rocks of very different ages.

——— Synopsis of the family Veneridæ and of the North American recent species.

Proc. U. S. Nat. Mus., XXVI, No. 1312, Dec. 29, 1902, pp. 335–412, pl. XII–XVI.

A review of the history, distribution, bibliography, nomenclature, and classification of this family of bivalve mollusks, and a summary of the recent species known to exist on the east and west coasts, respectively, of the North American continent. The following groups, genera, subgenera, or sections are named and defined as new: Subgenus *Pelecyora*, sections (of Dosinia) *Austrodosinia*, *Dosinisca*, *Dosinorbis*, *Dosinidia*, *Dosinella;* subgenus *Grateloupina* (for *Cytheriopsis* Conrad, not McCoy), section *Solanderina* (of *Sunetta*); section *Radiocrista*, section *Parmulina*, section *Eucallista*, section *Hyphantosoma*, section *Lamelliconcha;* subgenus *Lepidocardia*, subgenus *Cyclorisma* (for *Cyclothyis* Conrad, not McCoy), section *Macridiscus*, section *Anomalodiscus*, section *Mercimonia*, section *Samarangia*, section *Protapes*, subgenus *Protothaca*, section *Callithaca;* are described as new and defined. *Transennella stimpsoni*, *Tivela abaconis*, *T. nasuta*, *T. brasiliana*, *Callocardia zonata*, *Cytherea strigillina*, *C. callimorpha*, *C. mazyckii*, from the east coast of America; and *Clementia solida*, *Callocardia catharia*, *Pitaria tomeana*, *P. callicomata*, *Cytherea magdalenæ*, *C. lepidoglypta*, *Cyclinella singleyi*, *Chione schottii*, *Chione obliterata*, *Chione pertincta*, *Venus apodema*, *Paphia sulculosa*, and *P. sephidia ovalis* from the west coast of America are described and figured as new. A number of species hitherto unfigured or imperfectly delineated are now figured in an accurate manner.

——— On the genus *Gemma* Deshayes.

Journ. Conchology, Manchester, England, X, No. 8, Dec. 1902, pp. 238–243.

A review and revision of the genus and the species belonging to it. The name *Psephidia* is substituted for *Psephis* Carpenter, not Guenée.

——— On the preservation of the marine animals of the northwest coast.

Rep. Smithsonian Inst., 1901 (1902), pp. 683–688.

A summary of the conditions under which the marine mammals of the northwest coast of America exist and a discussion of the probability of being able to preserve them from extermination.

——— A new *Crassatellites* from Brazil.

Nautilus, XVI, No. 9, Jan., 1903, pp. 101–102.

Crassatellites brasiliensis from off Rio de Janeiro, is described as new, from a region where the genus was previously unknown.

——— Hawaiian Physidæ.

Nautilus, XVI, No. 9, Jan. 1903, p. 106.

A note announcing the discovery of true *Physidæ* in the Hawaiian Islands, where previously it had been supposed that the reversed shells (resembling *Physa*, and often so called by early writers on this fauna) occurring there all belonged to the *Limnæidæ*.

——— Synopsis of the Carditacea and of the American species.

Proc. Acad. Nat. Sci. Phila. for 1902, Jan. 1903, pp. 696–716.

This paper, on the same lines as the synopsis of the *Veneridæ*, reviews the *Carditidæ* and the *Cyclocardiidæ* and gives lists of the species found on the east and west coasts of North and South America, with numerous notes. The following are described and figured as new: *Venericardia armilla*, *V. moniliata*, *V. gouldii*, *V. incisa*, *V. stearnsii*, *V. alaskana*, and *Cardita sulcosa*. *Venericardia rudis* Gray, and *V. monilicosta* Gabb, are revived for valid species, and *Cardita grayi* is proposed for *C. crassa* Gray, not Lamarck. The new species named in this paper are figured on the plates accompanying the Synopsis of the *Astartidæ* (q. v.).

——— Review of the classification of the Cyrenacea.

Proc. Biol. Soc. Wash., XVI, Feb. 21, 1903, pp. 5–8.

This is a very condensed statement of the classification proposed for the *Cyrenidæ* and *Sphæriidæ*. *Miodontopsis* is proposed for *Miodon* Sandberger (not Carpenter), and *Profischeria* for *Fischeria* Bernardi (not Desvoidy).

DALL, WILLIAM HEALEY—Continued.

The following groups are named and briefly diagnosed as new: Section *Corbiculina*, *Tellinocyclas*, and *Cyrenodonax*, under *Corbicula*; section *Cyclocalyx*, subgenera *Cymatocyclas*, and *Tropidocyclas*, under *Sphærium*. It is also pointed out that *Cyclas* (Bruguiere) Link, 1807, is based on *Venus islandica* Linnæus, which afterwards became the type of *Cyprina* Lamarck, *Arctica* Schumacher, and *Cyprinidea* Rovereto.

——— Note on the name *Miodon*.

Nautilus, XVI, No. 12, Apr., 1903, p. 143.

The new name *Miodontiscus* is proposed for the genus *Miodon* Carpenter, 1865 (not Duméril, 1859).

——— Biographical memoir of Augustus Addison Gould, 1805–1866, by Jeffries Wyman, with additions by William Healey Dall, read before the National Academy of Sciences, April 22, 1903.

Biographical Memoirs, Nat. Acad. Sci., Washington, 1903, pp. 93–113.

Contains a revision and enlargement of Wyman's memoir, with Scudder's bibliography of Gould's writings, and the addition of a portrait and facsimile signatures. Also issued separately with cover.

——— A preliminary catalogue | of the | shell-bearing marine mollusks and brachiopods | of the | southeastern coast of the United States, | with illustrations of many of the species. | By | William Healey Dall, A. M., | Honorary Curator Division of Mollusks, U. S. National Museum. | — | Reprint. | To which are added twenty-one plates [with explanations and a supplementary list of species] not in the edition of 1889. | — | Washington: | Government Printing Office. | 1903.

Bull. U. S. Nat. Mus., No. 37, 1903, pp. 1–232, pls. I–XCV.

DALL, WILLIAM HEALEY, and BARTSCH, PAUL. A new Rissoa from California.

Nautilus, XVI, 8, Dec., 1902, p. 94.

Rissoa kelseyi is described as new. It is named in honor of Mr. F. W. Kelsey, of San Diego, Cal., who collected the specimens at Pacific Beach, Cal. The type and two specimens are registered as No. 168605, U.S.N.M. States National Museum.

DYAR, HARRISON G. Descriptions of the larvæ of some moths from Colorado.

Proc. U. S. Nat. Mus., XXV, No. 1290, Sept. 23, 1902, pp. 369–412.

New species: *Gnorimoschema coquillettella*, *Gracilaria* (*Dialectica*) *pnosmodiella*.

DYAR, HARRISON G. A list | of | North American Lepidoptera and | key to the literature of this | order of insects. | By Harrison G. Dyar, Ph. D., | custodian of Lepidoptera, United States National Museum, | assisted by | C. H. Fernald, Ph. D., the late Rev. George D. Hulst, | and August Busck, | — | Washington: | Government Printing Office. | 1902.

Bull. U. S. Nat. Mus., No. 52, 1902 (1903), pp. i–xix, 1–723.

EVERMANN, BARTON W. (See under J. A. ALLEN and DAVID S. JORDAN.)

FERNALD, C. H. (See under HARRISON G. DYAR.)

FISH, PIERRE A. The cerebral fissures of the Atlantic walrus.

Proc. U. S. Nat. Mus., XXVI, No. 1325, Apr. 9, 1903, pp. 675–688, pls. XXVIII–XXIX.

FISHER, WALTER K. A new Procelsterna from the Leeward Islands, Hawaiian group.

Proc. U. S. Nat. Mus., XXVI, No. 1322, Jan. 29, 1903, pp. 559–563.

Procelsterna saxatilis (p. 559) is described as a new species.

FOWLER, HENRY W. (See under DAVID STARR JORDAN.)

GILL, THEODORE. General history of birds.

Osprey, VI, No. 7, July, 1902, pp. 35–42.

The seventh chapter of a proposed work on ornithology.

——— The story of a word—Mammal.

Pop. Sci. Monthly, LXI, Sept., 1902, pp. 434–438.

The etymology and singular form of the word Mammalia have been erroneously given in all dictionaries as derived from the Latin adjective *mammalis* and as cognate with various words in living European languages. It is contended that the name was first given by Linnæus in 1758, and that he formed it in analogy with *Animalia* and derived it directly from the noun *Mamma* and added the suffix *-alia*. A history of the use of the word is given.

——— The first use of Mammals and Mammalians.

Science (new series), XVI, No. 417, Dec. 26, 1902, pp. 1034–1035.

The earliest use of the word Mammals seems to have been made by Good in 1813 in the Pantalogia, and that of Mammalians by Kirby in 1835 in his Bridgewater treatise.

GILL, THEODORE. The hosts of Argulids and their nomenclature.

Science (new series), XVII, No. 418, Jan. 2, 1903, p. 33.

The names of the fish-hosts of many of the species described in the "Monograph of North American Parasitic Copepods of the family Argulidæ," by C. B. Wilson, are corrected and the fishes identified.

——— The bones of the shoulder girdle of fishes.

Science (new series), XVII, No. 424, Feb. 13, 1903, pp. 255–256.

The most characteristic system of bones of the pisciform vertebrates is manifest in the shoulder girdle, and the classes of selachians and typical fishes, or teleostomes, have been segregated under the name *Lyrifera*, on account of the character of this girdle. The consideration of the bones, however, militates decidedly against the acceptance of the views generally held. Scapula and coracoid were given originally to the composite bone and its process familiar from manifestation in man. The bones of fishes to which the names have been given are certainly not homologous. They, in fact, are only developed as such in fishes specialized as teleosts and very remote from the primitive stock of the terrestrial vertebrates. A special nomenclature is therefore necessary. The so-called scapula has been designated as *hypercoracoid*, the coracoid as *hypocoracoid*, and the Spangenstuck, or precoracoid, as *mesocoracoid*. The mesocoracoid disappears in most fishes, all the acanthopterygians and offshoots from that stock being deprived of that ossicle.

——— The systematic relations of the fish genus *Lampris*.

Science (new series), XVII, No. 424, Feb. 13, 1903, pp. 256–257.

Recently the foremost ichthyologist of Europe, Doctor Boulenger, reexamined the osteology of *Lampris*, and especially the shoulder girdle, and attained novel conceptions as to the affinities of that genus. The number of bones in the shoulder girdle of *Lampris* is the same as in ordinary acanthopterygian fishes, but two of them have been interpreted from a different standpoint than by his predecessors. (1) The very large bone which occupies the lower and posterior part of the girdle was considered by him to be a peculiar bone, named interclavicle, and homologized with a homonymous bone of the hemibranchs, and (2) the smaller one immediately above it and behind the bones supporting the pectoral fin was regarded as a "coracoid" or hypocoracoid. Therefore he considered it as the representative not only of a peculiar family (Lamprididæ), but of an independent higher group named Selenichthyes and coordinated with the Hemibranchii and Lophobranchii, the three being associated together as representatives of a suborder to which the new name Catosteomi was given. To test this conclusion the skeleton of *Lampris* was submitted to renewed examination. That examination forced the author to acceptance of the principal ideas of the older ichthyologists; four actinosts, or pterygials, are recognized, and the coracoid of Boulenger is identified with the fourth. The hypocoracoid is found in the interclavicle of Boulenger. As a consequence, the genus is restored to the group of acanthopterygians. Nevertheless, the differences between *Lampris* and all other fishes are sufficiently great to entitle it to rank as the type of a family (Lamprididæ), as well as a special superfamily (Lampridoidea).

——— Origin of the name Monotremes.

Science (new series), XVII, No. 428, Mar. 13, 1903, pp. 433–434.

It is shown that the name Monotremes was given by E. Geoffroy as an ordinal designation (in French form only) in 1803, the order (ordre) diagnosed, and the genera "*Ornithorhinchus*" and "*Echidna*" referred to it.

——— Homologies of the anterior limb.

Science (new series), XVII, No. 430, Mar. 27, 1903, p. 489.

It is contended that *Polypterus* gives us a key to the problem in question, as has been already urged by the writer in 1872, 1878, and 1882. This view, after long neglect, was independently urged later by others, especially Emery and Pollard, but with differences of detail. The humerus, radius, ulna, carpal, and metacarpal bones are found in a recognizable condition in *Polypterus*. That genus is the nearest of the living fishes in relationship to the amphibians and consequently all terrestrial vertebrates

——— The use of the name Torpedo for the electric catfishes.

Proc U S. Nat Mus. XXVI, No. 1329, Apr. 9, 1903, pp. 697. 698.

It is shown that the name Torpedo was used in "Purchas his Pilgrimes" published in 1625, for the electric catfish of *Malapterurus electricus* of the Nile. Two sections descriptive of the fish occurring in that work (pp. 1183, 1545) are reproduced.

——— Bibliographical memoir | of | John Edwards Holbrook. | 1794–1876. | — | Read before the National Academy of Sciences, | April 22, 1903. | — | Washington, D. C. | Press of Judd and Detweiler | 1903. |

[8 vo., cover, title + 47–77 pp., 2 pl.]

An advance reprint from the Biographical Memoirs of the National Academy of Sciences, VI, pp. 47–77, with portrait and letter. Besides the biography of Holbrook a bibliography is appended, giving analyses and correlations of the different editions of Holbrook's works on reptiles and fishes.

GILL, THEODORE. Walbaum and binomialism.

Science (new series), XVII, No. 436, May 8, 1903, pp. 744-746.

In refutation of Mr. Henry W. Fowler's contention that "Walbaum is nonbinomial," it is demonstrated, by an analysis of his treatment of the genus *Colitis*, that he was binomial. Remarks on the attitude of Linnæus with respect to binomial nomenclature are prefixed.

——— The devilfish and some other fishes in North Carolina.

Forest and Stream, LX, No. 22, May 30, 1903, p. 431.

Reference is made to various fish names used in Brickell's "Natural History of North Carolina," published in 1737. The story of the devilfish running away with a "vessel for a league or two" is repeated. Information is asked if certain names are still used for fishes, viz, "Sea-Tench" for the Tautog, "Welchmen" for black basses, and "Irishmen" for crappies.

——— The first edition of Holbrook's North American Herpetology.

Science (new series), XVII, No. 440, June 5, 1903, pp. 910-912.

Supplement to the Biographical Memoir of Holbrook. It had been universally supposed that the first edition had been discontinued with the third volume. Mr. Witmer Stone, however, found a copy of a fourth volume in the Academy of Natural Sciences of Philadelphia, and an analysis of this is published, with considerations on its bearing on nomenclature. The volume appears to have been suppressed.

——— (See also under J. A. ALLEN.)

GRINNELL, JOSEPH. The California Yellow Warbler.

Condor, V, No. 3, May 19, 1903, pp. 71-73.

A discussion of the California yellow warblers, with description of a new subspecies, *Dendroica æstiva brewsteri*.

HASSALL, ALBERT. (See under CHARLES W. STILES.)

HAY, WILLIAM PERRY. Observations on the crustacean fauna of the region about Mammoth Cave, Kentucky.

Proc. U. S. Nat. Mus., XXV, No. 1285, Sept. 12, 1902, pp. 223-236, 1 text fig.

Based on material obtained during a visit by the writer to Mammoth Cave in 1901. A new amphipod, *Gammarus propinquus*, is described, and also a new form of crayfish, *Cambarus bartonii tenebrosus*.

——— Observations on the crustacean fauna of Nickajack Cave, Tennessee, and vicinity.

Proc. U. S. Nat. Mus., XXV, No. 1292, Sept. 23, 1902, pp. 417-439, 1 map and 8 figs. in text.

HAY, WILLIAM PERRY—Continued.

Describes visits made by himself to Nickajack Cave and other caves in Tennessee and Georgia. Among the crustaceans collected there is one new amphipod, *Gammarus purpurascens*, and two new subspecies of *Cambarus*, *C. bartonii cavatus*, and *C. latimanus striatus*.

——— On a small collection of crustaceans from the island of Cuba.

Proc. U. S. Nat. Mus., XXVI, No. 1316, Feb. 2, 1903, pp. 429-435, 3 text figs.

The collection was made by Dr. C. H. Eigenmann, while investigating the fauna of limestone caverns in Cuba. Fourteen species are enumerated, of which three are new, *Cirolana cubensis*, *Palæmonetes eigenmanni*, and *P. cubensis*; the first two are subterranean and blind.

HELLER, EDMUND. Papers from the Hopkins-Stanford Galapagos Expedition, 1898-99. XIV. Reptiles.

Proc. Wash. Acad. Sci., V, Feb. 26, 1903, pp. 39-98.

The account of *Phyllodactylus tuberculosus* is based on the specimens in the U. S. National Museum, lent for the purpose.

HEMSLEY, W. BOTTING. (See under JOSEPH N. ROSE.)

HENDERSON, JOHN B., Jr. (See under CHARLES T. SIMPSON.)

HINDS, WARREN ELMER. Contribution to a monograph of the insects of the order Thysanoptera inhabiting North America.

Proc. U. S. Nat. Mus., XXVI, No. 1310, Dec. 20, 1902, pp. 79-242, pls. I-XI, text figs. 1-127.

HOLMES, WILLIAM H., and MASON, OTIS TUFTON. Instructions to collectors of historical and anthropological specimens.

Bull. U. S. Nat. Mus., No. 39, Part Q, Aug. 8, 1902, pp. [1]-[16].

HOWARD, L. O. The warfare against mosquitoes—A record of what has been accomplished the last two years—How to exterminate mosquitoes—A practical work for village improvement societies.

Country Life in America, Apr., 1903, III, No. 6, pp. 251-253, figs. 100-106.

——— Our enemies the insects.

Youths' Companion, Apr. 30, 1903, pp. 211-212.

——— The tomb of Thomas Say.

Canadian Entomologist, XXXV, No. 5, May 1, 1903, pp. 138-139.

HOWARD, L. O. The world-wide crusade.

Proceedings First Anti-mosquito Convention, Brooklyn, N. Y., Jan., 1904, pp. 19–21; 1 fig. (portrait).

A brief review of anti-mosquito work then going on in different parts of the world.

HOWELL, ARTHUR H. (See under J. A. ALLEN.)

HRDLICKA, ALES. The Lansing skeleton.

Am. Anthropologist (new series), v, No. 2, April-June, 1903, pp. 323–330.

The paper is a description of the skeleton and a comparison of the skull with several Indian crania from the same general region.

The conclusion is that the skeleton, so far as the physical characteristics are concerned, is practically identical in type with that of the modern Indian of the same region and presents no indications of any great antiquity.

HULST, GEORGE D. (See under HARRISON G. DYAR.)

JORDAN, DAVID STARR. Supplementary note on *Bleekeria mitsukurii* and on certain Japanese fishes.

Proc. U. S. Nat. Mus., XXVI, No. 1328, Apr. 9, 1903, pp. 693–696, pl. XXX, figs. 1–3.

——— (See also under J. A. ALLEN.)

JORDAN, DAVID STARR, and EVERMANN, BARTON WARREN. Notes on a collection of fishes from the Island of Formosa.

Proc. U. S. Nat. Mus., XXV, No. 1289, Sept. 24, 1902, pp. 315–368, figs. 1–29.

New species: *Zacco evolans, Acheilognathus mesembrinum, Anguilla remifera, Gymnothorax pescadoris, Ophicephalus tadianus, Channa formosana, Bleekeria mitsukurii, Pempheris nyctereutes, Nemipterus matsubaræ, Plectorhynchus ocyurus, Polydactylus rhadinus, Chærops nyctemblema, Hemipteronotus verrens, Sillago æolus, Salarias namiyei, Brotula formosæ, Cynoglossus diplasios.*

JORDAN, DAVID STARR, and FOWLER, HENRY W. A review of the Oplegnathoid fishes of Japan.

Proc. U. S. Nat. Mus., XXV, No. 1278, Aug. 30, 1902, pp. 75–78.

——— A review of the trigger-fishes, file-fishes, and trunk-fishes of Japan.

Proc. U. S. Nat. Mus., XXV, No. 1287, Sept. 17, 1902, pp. 251–286, figs. 1–6.

New genus: *Rudarius.*

New species: *Rudarius ercodes, Brachaluteres ulvarum.*

——— A review of the cling-fishes (Gobiesocidæ) of the waters of Japan.

Proc. U. S. Nat. Mus., XXV, No. 1291, Sept. 19, 1902, pp. 413–416, fig. 1.

New genus: *Aspasma.*

New species: *Aspasma ciconiæ.*

JORDAN, DAVID STARR, and FOWLER, HENRY W. A review of the Chætodontidæ and related families of fishes found in the waters of Japan.

Proc. U. S. Nat. Mus., XXV, No. 1296, Sept. 30, 1902, pp. 513–563, figs. 1–6.

New species: *Cyttopsis itea, Antigonia steindachneri, Chætodon dædalma, Coradion desmotes, Holacanthus ronin.*

——— Notes on little-known Japanese fishes, with description of a new species of *Aboma.*

Proc. U. S. Nat. Mus., XXV, No. 1298, Oct. 2, 1902, pp. 573–576, fig. 1.

New species: *Aboma snyderi.*

——— A review of the Berycoid fishes of Japan.

Proc. U. S. Nat. Mus., XXVI, No. 1306, Nov. 25, 1902, pp. 1–21, figs. 1–4.

——— A review of the Ophidioid fishes of Japan.

Proc. U. S. Nat. Mus., XXV, No. 1303, Dec. 2, 1902, pp. 743–766, figs. 1–6.

New genus: *Hierichthys.*

New species: *Hierichthys encryptes, Lycenchelys pœcilimon, Bothrocara zesta, Otophidium asiro, Porogadus güntheri.*

——— A review of the Elasmobranchiate fishes of Japan.

Proc. U. S. Nat. Mus., XXVI, No. 1324, Mar. 30, 1903, pp. 593–674, pls. XXVI–XXVII, figs. 1–10.

——— A review of the Cepolidæ or band-fishes of Japan.

Proc. U. S. Nat. Mus., XXVI, No. 1330, Apr. 9, 1903, pp. 699–702, fig. 1.

——— A review of the Cobitidæ, or loaches of the rivers of Japan.

Proc. U. S. Nat. Mus., XXVI, No. 1332, Apr. 9, 1903, pp. 765–774, figs. 1, 2.

——— A review of the dragonets (Callionymidæ) and related fishes of the waters of Japan.

Proc. U. S. Nat. Mus., XXV, No. 1305, May 9, 1903, pp. 939–959, figs. 1–9.

New genera: *Draconetta, Calliurichthys.*

New species: *Draconetta xenica, Calliurichthys doryssus, Callionymus flagris, C. calliste, C. virgis.*

JORDAN, DAVID STARR, and SNYDER, JOHN OTTERBEIN. A review of the Blennoid fishes of Japan.

Proc. U. S. Nat. Mus., XXV, No. 1293, Sept. 26, 1902, pp. 441–504, figs. 1–28.

New genera: *Zacalles, Azuma, Zoarchias, Abryois.*

New species: *Tripterygion etheostoma, T. bapturum, Zacalles bryope, Petroscirtes elatus, Aspidontus trossulus, A. dasson, Scartichthys enosimæ, S. stellifer, Azuma emmnion, Bryostemma otohime, B. saitone, Alectrias benjamini,*

JORDAN, DAVID STARR, and SNYDER, JOHN OTTERBEIN—Continued.

Neozoarces steindachneri, Zoarchias veneficus, Opisthocentrus zonope, Abryois azumæ, Ernogrammus epallax, Stichæus nozawæ, Lumpenus fowleri.

——— Descriptions of two new species of Squaloid sharks from Japan.

Proc. U. S. Nat. Mus., XXV, No. 1279, Sept. 2, 1902, pp. 79–81, figs. 1, 2.

New genus: *Deania.*

New species: *Etmopterus lucifer, Deania eglantina.*

——— On certain species of fishes confused with *Bryostemma polyactocephalum.*

Proc. U. S. Nat. Mus., XXV, No. 1300, Nov 4, 1902, pp. 613–618, figs. 1–3.

New genus: *Bryolophus.*

New species: *Bryostemma tarsodes, B. decoratum, Bryolophus lysimus.*

JORDAN, DAVID STARR, and STARKS, EDWIN CHAPIN. A review of the Hemibranchiate fishes of Japan.

Proc. U. S. Nat. Mus., XXVI, No. 1308, Dec. 2, 1902, pp. 57–73, figs. 1–3.

——— A review of the Synentognathous fishes of Japan.

Proc. U. S. Nat. Mus., XXVI, No. 1319, Feb. 4, 1903, pp. 525–544, figs. 1–3.

——— Description of a new species of sculpin from Japan.

Proc. U. S. Nat. Mus., XXVI, No. 1326, Apr. 11, 1903, pp. 689, 690, fig. 1.

KNOWLTON, FRANK H. Change of name of *Ficus? hesperia*, from the vicinity of Ashland, Oreg.

Proc. Biol Soc. Wash., XV, Apr. 25, 1902, p. 86.

The name *Ficus? hesperia* has been used in the Bulletin of the U. S. Geological Survey on the Flora of the Montana Formation, for a plant from the North Fork of Dutton Creek in the Laramie Plains, Wyoming, and also for a different species from the vicinity of Ashland, Oreg., in the 20th Annual Report of the U. S. Geological Survey, and as the former antedates the latter, the change to *Ficus? applegatei* is made.

——— Notes on the fossil fruits and lignites of Brandon, Vt.

Bull. Torrey Botan. Club, No. 29, Nov., 1902, pp. 635–641, pl. 25.

The occurrence and geological position of the lignites are described and the conclusion reached that in age they are younger than the Eocene. These Brandon lignites are also determined to be largely coniferous. Selected specimens upon examination were found to be only varietally different from Schmaulhausen's *Pitoxylon microporosum*, and for the Brandon form the name *Pityoxylon microporosum brandonianum* is proposed. One small specimen was determined to be dicotyledonous, probably allied to *Betula*. The author had intended making an exhaustive microscopic study of the structure of the fruits so abundant in these lignites, but was prevented from completing the work, and therefore presents only some scattered notes on a few of the species, to one of which he gives the new name *Cucumites lesquereuxii.*

KNOWLTON, FRANK H.—Continued.

——— Report on a small collection of fossil plants from the vicinity of Porcupine Butte, Montana.

Bull. Torrey Botan. Club, No. 29, Dec., 1902, pp. 705–709, pl. 26, fig. 1 (in text).

In this paper four species are enumerated, among them one that is new—*Tillia weedii*—and the age of the beds in which they occur is given as the Fort Union Tertiary.

——— Fossil flora of the John Day basin, Oregon.

Bull. U. S. Geol. Surv., No. 204, 1902, pp. 1–113, pls. I–XVII.

The John Day basin lies in north central Oregon between the north and south ranges of the Blue Mountains, covering an area of approximately 10,000 square miles, drained by the John Day River and its tributaries. The flora of the basin, as set forth in this paper, comprises 150 forms distributed among 37 natural families and the anomalous group of Phyllites. Of the 150 forms enumerated, 24 have not been specifically named, and 44 species and one variety are described as new, the previously known species numbering 81. The beds are all of Tertiary age, ranging from Lower Eocene to Upper Miocene. The conditions prevailing in the John Day basin in Tertiary times extended into central Washington, northwestern Idaho, and western Oregon.

KOTINSKY, JACOB. The first North American Leaf-gall Diaspine.

Proc. Ent. Soc. Wash., V. 1903, pp. 149–150.

Describes *Cryptophyllaspis liquidambaris*, new species.

LUCAS, FREDERIC A. Palæontological notes.

Science (new series), XVI, No. 402, Sept. 12, 1902, p. 435.

The name *Dacentrurus* is proposed to replace *Omosaurus*, this being preoccupied. *Hoplitosaurus marshi* is proposed to replace *Stegosaurus marshi*, this dinosaur being shown to be related to *Polacanthus.*

——— Aves.

Text Book of Palæontology, by Karl von Zittel, Nov., 1902, pp. 256–278, figs. 362–373.

LUCAS, FREDERIC A.—Continued.

A brief description of the osteology and main divisions of the Class Aves, with special reference to fossil species. Based partly on palæontological and osteological material in the Museum collections.

——— Animals before man in North America.

D. Appleton & Co., Nov., 1902, pp. i–vii, 1–291, 6 pls. and numerous text figs.

A popular account of the succession of life in North America.

Many references to specimens in the U. S National Museum.

——— The weapons of birds.

Bird Lore, Nov.–Dec., 1902, pp. 182–185, 6 text figs.

——— The Dinosaurs or Terrible Lizards.

Rep. Smithsonian Inst., 1901 (1902), pp. 641–647, pls. 1–4.

A popular account of the Dinosaurs, reprinted from "Animals of the Past."

——— The Greatest Flying Creature, the Great Pterodactyl *Ornithostoma*.

Rep. Smithsonian Inst., 1901 (1902), pp. 654–659, pls. 1–3, 1 text fig.

A popular account of this flying reptile, comparisons being made with birds and bats as to size and power of flight.

——— Notes on the osteology and relationships of the fossil birds of the genera *Hesperornis*, *Hayeria*, *Baptornis* and *Diatryma*.

Proc. U. S. Nat. Mus., XXVI, No. 1320, Feb. 4, 1903, pp. 545–556, 8 figs.

Additional information is given as to the structure of the skeleton in *Hesperornis* and *Baptornis;* the genus *Hayeria* is proposed for *Hesperornis gracilis*, and it is suggested that *Diatryma* belongs in the Stereonithes.

——— Flight.

Article in *International Cyclopædia*, Dodd, Mead & Co.

An account of the mechanism of flight as found in various animals, especially vertebrates, and the method by which it is performed.

LYON, MARCUS W., Jr. *Lophostoma venezuelæ* changed to *Tonatia venezuelæ*.

Proc. Biol. Soc. Wash., XV, Dec. 16, 1902, p. 248.

——— Observations on the number of young of the Lasiurine bats.

Proc. U. S. Nat. Mus., XXVI, No. 1314, Jan. 26, 1903, pp. 425–426, pl. XVII.

Four young usually are produced at a birth.

McMURRICH, J. PLAYFAIR. Note on the Sea Anemone, *Sagartia paguri* Verrill.

Proc. U. S. Nat. Mus., XXVI, No. 1315, Jan. 27, 1903, pp. 427–428, 2 text figs.

Description of specimens obtained by Dr. D. S. Jordan and Mr. J. O. Snyder in Japan, where the species lives adherent to the chela and the shell of the hermit crab, *Diogenes edwardsii* (de Haan).

MAIDEN, JOSEPH HENRY. On the identification of a species of *Eucalyptus* from the Philippines.

Proc. U. S. Nat. Mus., XXVI, No. 1327, Apr. 11, 1903, pp. 691, 692.

MARLATT, C. L., Résumé of the search for the native home of the San Jose scale in Japan and China.

Bull. Div. Ent., U. S. Dept. Agric. (new series), No. 37, Oct. 3, 1902, pp. 65–78.

——— Preliminary report on the importation and present status of the Asiatic ladybird (*Chilocorus similis*).

Bull. Div. Ent., U. S. Dept. Agric. (new series), No. 37, Oct. 3, 1902, pp. 78–84.

——— Predatory insects which affect the usefulness of scale-feeding Coccinellidæ.

Bull. Div. Ent., U. S. Dept. Agric. (new series), No. 37, Oct. 3, 1902, pp. 84–87.

——— Report of the Acting Entomologist for 1902.

Ann. Rep. U. S. Dept. Agric. 1902, pp. 189–207.

This report was submitted Aug. 2, 1902, and published in Dec., 1902. Extras with title page and table of contents were printed.

——— Collecting notes on mosquitoes in Oriental countries.

Proc. Ent. Soc. Wash., V, No. 2, pp. 111–123.

Author's extras were published Jan. 31, 1903.

——— Notes on the periodical cicada in the District of Columbia in 1902.

Proc. Ent. Soc., Wash., V, No. 2, pp. 124–126.

Author's extras were published Feb. 4, 1903.

——— An early record of the periodical cicada.

Proc. Ent. Soc. Wash., V, No. 2, pp. 126–127.

Author's extras were published Feb. 4, 1903.

——— A chalcidid parasite of the Asiatic ladybird.

Proc. Ent. Soc. Wash., V, No. 2, pp. 138–139.

Author's extras were published Feb. 4, 1903.

MARLATT, C. L. The lime, sulphur, and salt wash.

Circ. Div. Ent., U. S. Dept. Agric., Div. of Ent. (second series), No. 52, pp. 8, Feb. 20, 1903, pp. 1 to 8.

——— The Entomological Club of the American Association for the Advancement of Science. Report by the secretary.

Can. Ent., XXXV, Mar., 1903, pp. 53–58; XXXV, Apr., 1903, pp. 79–87.

——— Japan's foremost entomologist.

Ent. News, XIV, No. 3, Mar., 1903, pp. 65–68, pl. IV.

——— How to control the San Jose scale.

Circ. Div. Ent., U. S. Dept. Agric., Div. Ent. (second series), No. 42, 7 pp., Mar. 25, 1903. Third edition, extensively revised.

——— Scale insects and mites on citrus trees.

Farmers' Bull., U. S. Dept. Agric. Div. Ent., No. 172, Apr. 17, 1903, pp. 42, figs. 34.

Revision of the Yearbook article by Mr. Marlatt.

——— Applied entomology in Japan.

Bull. Div. Ent., U. S. Dept. Agric. (new series), No. 40, pp. 56–63, pls. I, II. (Issued Apr. 25, 1903.)

——— A house-boat collecting trip in China.

Can. Ent., XXXV, Apr., 1903, pp. 79–87.

——— The San Jose scale—its natural home and natural enemy.

Yearbook U. S. Dept. Agric., 1902, pp. 155–174.

Author's extras were issued June 6, 1903.

MARSHALL, WILLIAM B. Tea.

Am. Journ. Pharmacy, LXXV, No. 2, Feb., 1903, pp. 79–94.

Part of a lecture before the Pharmaceutical Association of the Philadelphia College of Pharmacy. Describes the botany, geography and history, cultivation, preparation, chemistry, effects, social status, adulterants, and commerce of tea.

MASON, OTIS TUFTON. (See under WILLIAM H. HOLMES.)

MAXON, WILLIAM R. A Japanese Polypody.

Pop. Sci. News, XXXVI, Oct., 1902, p. 221, 2 pls.

A popular account of the peculiar way *Polypodium japonicum* has of forming spirals by the sidewise tortion of its midrib.

——— A botanists' mecca.

Plant World, VI, Feb., 1903, p. 38.

Note on the Hart's-tongue in Central New York.

MAXON, WILLIAM R. Notes on American ferns, VI.

Fern Bull., XI, Apr., 1903, pp. 38–40.

(1) Mention is made of a cristate form of *Woodwardia spinulosa* from California. (2) *Adiantum modestum* Underw. is reported from Arizona. (3) *Polystichum munitum solitarium* subsp. nov., is described from Lower California.

——— A study of certain Mexican and Guatemalan species of *Polypodium*.

Contrib. U. S. Nat. Herbarium, VIII, pt. 3, June 27, 1903, pp. i–v; 271–279, pls. LXI, LXII.

A summary of results attending a study of plants referred to, or closely related to, *Polypodium subpetiolatum* Hook. *Polypodium aequalis, P. teresae, P. firmalum, P. fissidens* and *P. adelphum* are described as new.

——— (See also under LUCIEN M. UNDERWOOD.)

MAYER, P. Die Caprellidæ der Siboga-Expedition. Monographie XXXIV aus: | Uitkomsten op Zoologisch, | Botanisch, Oceano-graphisch en Geologisch Gebied | verzameld in Nederlandsch Oost-Indië 1899–1900 | aan boord H. M. Siboga onder commando van | Luitenant ter zee I^e kl. G. F. Tydeman | uitgegeven door | Dr. Max Weber | Prof. in Amsterdam, Leider der Expeditie | Leiden | Juin 1903 |

Folio, 160 pp., pls. I–X.

A comprehensive work covering not only the results of the Siboga Expedition, but collections from many different museums. Keys to the genera and species are given, also a bibliography, faunal lists of species, as well as a list of the Siboga collection, and a chapter on the morphology, biology, and phylogeny of the Caprellidæ.

MEARNS, EDGAR A. The Ocelot cats.

Proc. U. S. Nat. Mus., XXV, No. 1286, Sept. 17, 1902, pp. 237–249.

New species: *Felis costaricensis, F. æquatorialis.*

MERRIAM, C. HART. (See under J. A. ALLEN.)

MERRILL, GEORGE P. A newly found meteorite from Mount Vernon, Christian County, Ky.

Am. Geologist, XXXI, Mar., 1903, pp. 156–158.

A brief paper giving a preliminary notice of a 351-pound pallasite that had recently come into the possession of the National Museum.

——— Stones | for | Building and Decoration. | By | George P. Merrill, | Curator of Geology in the United States

MERRILL, GEORGE P.—Continued.

National Museum and Professor of Geology | in Columbian University; author of "Rocks, Rock-weathering, and | Soils," "The Nonmetallic Minerals," etc. | Third edition, Revised and Enlarged. | New York: | John Wiley & Sons. | London: Chapman & Hall, Limited. | 1903.

8 vo., pp. i-xi, 1-551, pls. I-XXXIII, figs. 1-24.

This is a third edition of a work published in 1891 and based upon the author's catalogue of the Collection of building and ornamental stones in the U. S. National Museum forming a part of the Report of the U. S. National Museum for 1886.

MILLER, GERRIT S., Jr. Two new Malayan mouse deer.

Proc. Biol. Soc. Wash., XV, Aug. 6, 1902, pp. 173-175.

Tragulus ravus (p. 173) and *T. borneanus* (p. 174).

——— Twenty new American bats.

Proc. Acad. Nat. Sci. Phila. May, 1902, pp. 389-412. (Issued Sept. 12, 1902.)

Described as new: *Antrozous minor* (p. 389), *Pipistrellus cinnamomeus* (p. 390), *Dasypterus floridanus* (p. 392), *Nyctinomops* (new genus) (p. 393), *Nyctinomops yucatanicus* (p. 393), *Molossus nigricans* (p. 395), *Molossus pretiosus* (p. 396), *Nyctinomus antillularum* (p. 398), *Natalus major* (p. 398), *Natalus mexicanus*, (p. 399), *Chilonycteris portoricensis* (p. 400), *Chilonycteris mexicana* (p. 401), *Mormoops tumidiceps* (p. 403), *Dermanura rava* (p. 404), *Dermanura phæotis* (p. 405), *Vampyrops fumosus* (p. 405), *Stenoderma luciæ* (p. 407), *Hemiderma tricolor* (p. 408), *Brachyphylla nana* (p. 409), *Monophyllus cubanus* (p. 410), and *Monophyllus luciæ* (p. 411).

——— A new bat from the Island of Dominica.

Proc. Biol. Soc. Wash., XV, Dec. 16, 1902, pp. 243-244.

Myotis dominicensis, p. 243.

——— Two new tropical Old World bats.

Proc. Biol. Soc. Wash., XV, Dec. 16, 1902, pp. 245-246.

Nyctinomus pusillus (p. 245), and *Nyctinomus jobensis* (p. 246).

——— The common *Nyctinomus* of the Greater Antilles.

Proc. Biol. Soc. Wash., XV, Dec. 16, 1902, p. 248.

A distinct species which should be known as *Nyctinomus musculus* Gundlach.

——— The external characters of *Brachyphylla nana* Miller.

Proc. Biol. Soc. Wash., XV, Dec. 16, 1902, p. 249.

MILLER, GERRIT S., Jr. An overlooked specimen of *Chilonycteris psilotis*.

Proc. Biol. Soc. Wash., XV, Dec. 16, 1902, p. 249.

——— A second specimen of *Pterygistes azoreum*, Thomas.

Proc. Biol. Soc. Wash., XV, Dec. 16, 1902, p. 250.

——— The status of *Nyctinomus nevadensis* (H. Allen).

Proc. Biol. Soc. Wash., XV, Dec. 16, 1902, p. 250.

Identical with *Nyctinomops depressus* (Ward).

——— The generic position of *Nyctinomus orthotis* H. Allen.

Proc. Biol. Soc. Wash., XV, Dec. 16, 1902, p. 250.

A member of the genus *Promops*.

——— Mammals collected by Dr. W. L. Abbott on the coast and islands of Northwest Sumatra.

Proc. U. S. Nat. Mus., XXVI, No. 1317, Feb. 3, 1903, pp. 437-484.

The following species are described as new: *Tragulus amœnus* (p. 439), *Tragulus jugularis* (p. 440), *Tragulus brevipes* (p. 443), *Tragulus russeus* (p. 444), *Ratufa femoralis* (p. 447), *Ratufa nigrescens* (p. 448), *Ratufa lænata* (p. 449), *Sciurus mansalaris* (p. 451), *Sciurus bancarus* (p. 451), *Sciurus saturatus* (p. 453), *Sciurus pretiosus* (p. 454), *Sciurus ubericolor* (p. 455), *Sciurus erebus* (p. 456), *Mus simalurensis* (p. 458), *Mus surdus* (p. 460), *Mus domitor* (p. 461), *Mus catellifer* (p. 464), *Lenothrix* (new genus) (p. 466), *Lenothrix canus* (p. 466), *Trichys macrotis* (p. 469), and *Macacus fuscus* (p. 476).

——— Descriptions of eleven new Malayan Mouse Deer.

Proc. Biol. Soc. Wash., XVI, Mar. 19, 1903, pp. 31-44.

The following species are described as new: *Tragulus lutescens* (p. 32), *Tragulus flavicollis* (p. 33), *Tragulus formosus* (p. 34), *Tragulus focalinus* (p. 35), *Tragulus virgicollis* (p. 37), *Tragulus natunæ* (p. 38), *Tragulus subrufus* (p. 39), *Tragulus rubeus* (p. 40), *Tragulus ravulus* (p. 41), *Tragulus lancavensis* (p. 41), *Tragulus lampensis* (p. 42).

——— A new name for *Mus atratus* Miller.

Proc. Biol. Soc. Wash., XVI, Mar. 19, 1903, p. 50.

Mus atridorsum is substituted for *Mus atratus* Miller, 1902 (not *Mus atratus* Philippi, 1900).

——— The technical name of the Indian Flying Fox.

Proc. Biol. Soc. Wash., XVI, Mar. 19, 1903, p. 50.

The species should be known as *Pteropus giganteus* (Brünnich).

MILLER, GERRIT S., Jr. The short-leaved sundew in Virginia.

Proc. Biol. Soc. Wash., XVI, June 25, 1903, p. 102.

The plant is recorded from the vicinity of Hampton, Va.

——— (See also under J. A. ALLEN and LEONHARD STEJNEGER.)

NEEDHAM, JAMES G. A genealogic study of dragon-fly wing venation.

Proc. U. S. Nat. Mus., XXVI, No. 1331, Apr. 16, 1903, pp. 703–764, pls. XXXI–LIV, figs. 1–41.

NELSON, E. W. The nomenclature and validity of certain North American Gallinæ.

Auk, XIX, No. 4, Oct., 1902, pp. 386–391, pls. XIV, XV.

Reply to Mr. Ogilvie Grant's "Remarks on the Species of American Gallinæ recently described and notes on their nomenclature" (Ibis, 1902, pp. 233–245), in which various errors appearing in Mr. Grant's paper are rectified.

——— (See also under J. A. ALLEN.)

OBERHOLSER, HARRY C. Some new South American birds.

Proc. U. S. Nat. Mus., XXV, No. 1276, Aug. 30, 1902, pp. 59–68.

Descriptions of 12 new species and subspecies and 1 new genus, viz.: *Thamnophilus tephrogaster* (p. 59), *Synallaxis spixi notius* (p. 60), *Xenicopsis percnopterus* (p. 61), *Ochthœca rufimarginata acrophila* (p. 61), *Mecocerculus alutus* (p. 62), *M. stictopterus euplastus* (p. 63), *Rhynchocyclus scotius* (p. 63), *Perissotriccus* (p. 64), *Hemitriccus pammictus* (p. 64), *Pogonotriccus alleni* (p. 65), *Sirystes sibilator atimastus* (p. 66), *Icterus pyrrhopterus compsus* (p. 68), and *Icterus pyrrhopterus argoptilus* (p. 68).

——— List of birds collected by William T. Foster in Paraguay.

Proc. U. S. Nat. Mus., XXV, No. 1281, Sept. 8, 1902, pp. 127–147.

A list of about 60 species, with critical notes.

——— A new cliff swallow from Texas.

Proc. Biol. Soc. Wash., XVI, Feb. 21, 1903, pp. 15–16.

Petrochelidon lunifrons tachina is described from Langtry, Tex.

——— Description of a new Vireo.

Proc. Biol. Soc. Wash., XVI, Feb. 21, 1903, pp. 17–18.

Vireo bellii medius is described as a new subspecies from southwestern Texas.

——— A review of the genus *Catherpes*.

Auk, XX, No. 2, April, 1903, pp. 196–198.

Condensed diagnoses and geographical distributions of five forms of this genus, of which

OBERHOLSER, HARRY C.—Continued.

Catherpes mexicanus polioptilus is indicated as new.

——— A synopsis of the genus *Psaltriparus*.

Auk, XX, No. 2, April, 1903, pp. 198–201.

Notes on the seven recognized forms of this genus, to which are added the type localities and geographical distribution of each form.

PFENDER, CHARLES A. (See under CHARLES W. STILES.)

POLLARD, CHARLES LOUIS. Plants used for Cuban confectionery.

Plant World, V, July, 1902, pp. 131–132.

——— A new station for the Gray Polypody.

Plant World, V, July, 1902, pp. 133–134.

POLLARD, CHARLES LOUIS, and KNOWLTON, FRANK HALL.

Plant World, V, 168–170. Sept., 1902, pp. 168–170.

A sketch of F. H. Knowlton's scientific and literary work.

——— Two new violets from the eastern United States.

Proc. Biol. Soc. Wash., XV, Oct. 10, 1902, pp. 201–203.

Describes *Viola tenuipes* and *V. mulfordæ*.

——— The families of flowering plants. (Concluded from previous year.)

Plant World Supplement, July–Dec., 1902, pp. 235–253.

POLLARD, CHARLES LOUIS, and COCKERELL, THEODORE D. A. Four new plants from New Mexico.

Proc. Biol. Soc. Wash., XV, Aug. 6, 1902, pp. 177–179.

Viola wilmattæ, *Primula ellisiæ*, and *Achillea laxiflora* are described as new species.

PREBLE, EDWARD A. Birds of Keewatin.

North Am. Fauna, No. 22, Oct. 31, 1902, pp. 75–131.

An annotated list of all birds known to occur in this portion of the Hudson Bay region, with copious references to previous records.

RATHBUN, MARY J. Note on the generic name of the horseshoe crab.

Proc. Biol. Soc. Wash., XV, Oct. 10, 1902, p. 196.

Gives references to three binomial writers who have used the name *Xiphosura* prior to the first description of *Limulus*.

——— Descriptions of new species of Hawaiian crabs.

Proc. U. S. Nat. Mus., XXVI, No. 1309, Nov. 18, 1902, pp. 75–77, 4 text figs.

RATHBUN, Mary J.—Continued.

The crabs described, *Cyclograpsus henshaw*, and *Ozius hawaiicnsis*, were obtained by Messrs. H. W. Henshaw and R. C. McGregor.

——— Japanese stalk-eyed crustaceans.

Proc. U. S. Nat. Mus., xxvi, No. 1307, Nov. 28, 1902, pp. 23–55, 24 text figs.

Based on a collection made by Dr. David S. Jordan and Mr. J. O. Snyder in 1900. Nine shrimps and one hermit crab are described as new.

The first series of specimens is in the U. S. National Museum.

——— Crabs from the Maldive Islands.

Bull. Mus. Comp. Zool., Harvard College, xxxix, No. 5, Dec. 1902, pp. 123–138, 1 plate.

A list of 28 species obtained by Prof. Alexander Agassiz and party in 1901–1902, chiefly in the lagoons of the Maldive atolls. Six species are described as new.

——— (See also under J. A. Allen.)

RAVENEL, W. de C. The Pan-American Exposition. Report of the representative of the U. S. Fish Commission.

Rep. U. S. Fish Com., 1901 (1902), pp. 289–651, pls. 6–20.

RICHARDSON, Harriet. A new fresh-water Isopod of the genus *Mancasellus* from Indiana (p. 1294). A new terrestrial Isopod of the genus *Pseudarmadillo* from Cuba (p. 1295).

Proc. U. S. Nat. Mus., xxv, Nos. 1294 and 1295, Sept. 25, 1902, pp. 505–511, 8 text figs.

The first species *Mancasellus danielsi* was collected by Mr. L. E. Daniels at Lily Lake, Laporte, Ind.; the second, *Pseudarmadillo gillianus*, was obtained at the Isle of Pines, Cuba, by Messrs. William Palmer and J. H. Riley.

RICHMOND, Charles W. Descriptions of eight new birds from islands off the west coast of Sumatra.

Proc. Biol. Soc. Wash., xv, Aug. 6, 1902, pp. 187–190.

Palæornis major (p. 188) *Psittinus abbotti* (p. 188), *Thriponax parvus* (p. 189), *Hypothymis abbotti* (p. 189), *Hypothymis consobrina* (p. 189), *Malacopteron notatum* (p. 190), and *Stachyris banjakensis* (p. 190) are described as new species from Simalur and other islands off the west coast of Sumatra.

——— Birds collected by Dr. W. L. Abbott and Mr. C. B. Kloss in the Andaman and Nicobar islands.

Proc. U. S. Nat. Mus., xxv, No. 1288, Sept. 17, 1902, pp. 287–314.

A list of 101 species from the Andamans and Nicobars, with notes by the collectors. *Zosterops ventralis* (p. 288), *Sturnia erythropygia katchalensis* (p. 295), *Rhinomyias nicobarica* (p. 295), *Arachnechthra klossi* (p. 297), *Pitta abbotti* (p. 298), *Spilornis klossi* (p. 304), *Astur obsoletus* (p. 306), *Osmotreron chloroptera andamanica* (p. 308), and *Excalfactoria trinkutensis* are described as new. *Dissemurus malabaricus otiosus* is a new name for *D. affinis*, preoccupied.

——— [Review of] Bertoni's "Aves Nuevas del Paraguay."

Auk, xix, No. 4, Oct., 1902, pp. 414–416.

——— Note on *Pinaroloxias inornata* (Gould).

Proc. Biol. Soc. Wash., xv, Dec. 16, 1902, pp. 247–248.

Note showing that *Pinaroloxias inornata* is identical with *Cocornis agassizi*.

——— Birds collected by Dr. W. L. Abbott on the coast and islands of Northwest Sumatra.

Proc. U. S. Nat. Mus., xxvi, No. 1318, Feb. 4, 1903, pp. 485–524.

A list of 151 species collected or observed on the coast and islands of Northwestern Sumatra, with field notes by the collector. The following species are named for the first time: *Spilornis abbotti* (p. 492), *Pisorhina ambra* (p. 494), *Pelargopsis simalurensis* (p. 498), *P. sodalis* (p. 499), *Macropteryx perlonga* (p. 502), *Cyanoderma fulriventris* (p. 507), *Tchitrea procera* (p. 510), *Graucalus babiensis* (p. 513), *G. simalurensis* (p. 513), *Campephaga compta* (p. 514), *Oriolus mundus* (p. 517). *Columba grisea* and *Corvus tenuirostris* are renamed *C. phasma* and *C. compilator*, respectively, both of the former names being preoccupied.

RIDGWAY, Robert. Smithsonian Institution. | United States National Museum. | — | Bulletin | of the | United States National Museum. | No. 50. | — | Part II. | [Seal] Washington: | Government Printing Office. | 1902.

The Birds | of | North and Middle America: | A Descriptive Catalogue | of the | Higher Groups, Genera, Species, and Sub-species of Birds | Known to occur in North America, from the | Arctic Lands to the Isthmus of Panama, | the West Indies and Other Islands | of the Caribbean Sea, and the | Galapagos Archipelago. | By | Robert Ridgway, | Curator, Division of Birds. | — | Part II. | Family Tanagridæ—The Tanagers. | Family Icteridæ—The Troupials. | Family Cœrebidæ — The Honey Creepers. | Family

RIDGWAY, ROBERT—Continued.

Mniotiltidæ—The Wood Warblers. | — | Washington: | Government Printing Office. | 1902.

8 vo., pp. i–xx, 1–834, pls. i–xxii. (Published Oct. 16, 1902.)

The present part of this monograph deals with four exclusively American families of Passeres (Tanagridæ, Icteridæ, Cœrebidæ, and Mniotiltidæ), embracing 77 genera and 433 species and subspecies. The treatment of species is similar to that followed in the first part of the work. Brief descriptions of the known plumages are given, followed by measurements, the geographical ranges, and a full synonymy. The following forms are introduced as new: *Phœnicothraupis rubica nelsoni* (p. 145), *Compsothlypis americana ramalinæ* (p. 486), *Geothlypis incompta* (p. 677), *G. crigua* (p. 677), *G. flavida* (p. 678), *G. nelsoni microrhyncha* (p. 685), *Wilsonia pusilla chrysæola* (p. 714), *Basileuterus culicivorus flavescens* (p. 755), and *Rhodinocichla rosea eximia* (p. 770). Outline drawings representing the characters of the 77 genera treated in this part are given in the 22 plates accompanying the volume.

——— [Review of] Pycraft's Classification of the Falconiformes.

Science (new series), XVII, Mar. 27, 1903, 509–511.

A review of Pycraft's paper on the classification of this group, in which the reviewer points out the great similarity between the present arrangement and one formulated and published by him nearly thirty years before.

RILEY, J. H. The authority for the name *Geotrygon chrysia*.

Auk XIX, No. 4, Oct., 1902, p. 397.

Calls attention to the fact that Salvadori, not Bonaparte, should be quoted as authority for the above name.

——— Description of a new Quail Dove from the West Indies.

Proc. Biol. Soc. Wash., XVI, Feb. 21, 1903, pp. 13–14.

Geotrygon sabæ described from Saba Island.

ROSE, JOSEPH N. Studies of Mexican and Central American plants. No. 3.

Contrib. U. S. Nat. Herb., VIII, No. 1, June, 1903, pp. 1–55, pls. 1–12, figs. 1–11.

Describes two new genera and 58 species, revises several genera such as *Polianthes*, *Manfreda*, *Cologania*, and *Cornus*, and restores *Manfreda* to generic rank.

ROSE, JOSEPH N., with HEMSLEY, W. BOTTING. Diagnoses *Specierum generis juliana* Schlecht. Americæ Tropicæ.

Annals of Botany, XVII, No. 66, Mar., 1903, pp. 443–446.

The genus and species are redescribed and two new species are added.

This paper is to be followed by an illustrated monograph.

SCHUCHERT, CHARLES. On the Lower Devonic and Ontaric formations of Maryland.

Proc. U. S. Nat Mus., XXVI, No. 1313, Feb. 3, 1903, pp. 413–424.

Describes in detail the entire Upper Siluric strata of Maryland, which have a united thickness of 3,169 feet. These formations are followed by the Lower Devonic deposits, with a thickness of 608 feet (Helderbergian, 260 feet, and Oriskanian, 348 feet). The various formations are based on fossil content as fixed by the New York series, are of the North Atlantic type, and were laid down in the Cumberland Mediterranean.

——— [Review of] "Morse on living brachiopods."

Am. Geologist, Feb., 1903, pp. 112–121.

A review of "Observations on living brachiopods," by Edward S. Morse. The reviewer adds other observations based on fossil forms and especially regarding the punctate shell of brachiopods.

——— The I. H. Harris collection of invertebrate fossils in the U. S. National Museum.

Am. Geologist, Mar., 1903, pp. 131–135.

This paper presents a biographic sketch of Mr. Harris and an account of his large Cincinnatian collection, as now installed in this Museum. Also a list of the many collectors and paleontologists born or raised in the region of the Cincinnatian rocks.

——— On the Manlius formation of New York.

Am. Geologist, Mar., 1903, pp. 160–178.

The "Coralline limestone" correllated with the Niagara, is here shown to be but a part of the Manlius formation as originally defined by Vanuxem. The Manlius formation is then redefined; the fauna of the Cobleskill member is also reviewed.

SIMPSON, CHARLES T. A new Naiad from New Zealand.

Nautilus, XVI, No. 3, July, 1902, p. 30.

Diplodon websteri is described as new.

SIMPSON, CHARLES T., and HENDERSON, JOHN B., Jr. A new Haitien Chondropoma.

Nautilus, XVI, No. 8, Dec., 1902, pp. 88–89.

Chondropoma superbum from Thomazeau, Haiti, is described and figured as new. The type is in the collection of the U. S. National Museum (No. 168798).

SMITH, JOHN B. Contributions toward a monograph of the lepidopterous family Noctuidæ of Boreal North America. A revision of the moths referred to the genus *Leucania*, with descriptions of new species.

Proc. U. S. Nat. Mus., XXV, No. 1283, Sept. 13, 1902, pp. 159–209, pls. v, vi.

SMITH, JOHN B.—Continued.

New genus: *Neleucania.*

New species: *Leucania lutcopallens, L. rubripallens, L. obscurior, L. limitata, L. tetera, L. neptis, L. megadia, L. anteroclara, L. calgariana, L. oregona, L. pallisecca, Neleucania niveicosta, N. citronella.*

New name: *Leucania lutina.*

SNYDER, JOHN OTTERBEIN. (See under DAVID S. JORDAN.)

STARKS, EDWIN CHAPIN. The relationship and osteology of the caproid fishes or Antigoniidæ.

Proc. U. S. Nat. Mus., XXV, No. 1297, Sept. 25, 1902, pp. 565–572, figs. 1–3.

——— The shoulder girdle and characteristic osteology of the Hemibranchiate fishes.

Proc. U. S. Nat. Mus., XXV, No. 1301, Nov. 4, 1902, pp. 619–634, figs. 1–6.

New species: *Macrorhamphosus sagifue.*

——— (See also under DAVID S. JORDAN.)

STEARNS, R. E. C. *Helix* var. *circumcarinata* and *Pyramidula elrodi.*

Nautilus, XVI, 6, Oct., 1902, pp. 61–62.

——— *Pyramidula elrodi* and *Epiphrogonophora circumcarinata.*

Nautilus, XVI, 7, Nov., 1902, pp. 83–84.

——— The Oriental Sycamore as a street tree.

Pacific Rural Press, Dec. 20, 1902, San Francisco.

Recommends the planting in California streets and describes the merits, etc.

——— *Dracæna australis* for basketry purposes, etc.

Pacific Rural Press, Feb. 21, 1903, San Francisco.

Suggests the use of the leaves for making baskets, hampers, mats, etc.

——— Mollusks occurring in southern California.

Nautilus, XVI, 12, April, 1903, pp. 133–134.

——— Eucalyptus cultivated in the United States.

Science, XVII, May 29, 1903, pp. 858–860.

STEJNEGER, LEONHARD, Blue foxes on the Pribylof Islands.

Science (new series), XVI, Aug. 22, 1902, pp. 310–311.

Discusses the statistics of the number of blue foxes killed in the Pribylof Islands and considers the results obtained from sparing the females as satisfactory.

——— The reptiles of the Huachucha Mountains, Ariz.

Proc. U. S. Nat. Mus., XXV, No. 1282, Sept. 8, 1902, pp. 149–158.

STEJNEGER, LEONHARD—Continued.

Described as new: *Lampropeltis pyrrhometæna cetænops* (p. 153); type, U. S. N. M., No. 22375; and *Tantilla wilcoxi* (p. 156); type, U. S. N. M., No. 19674. New name: *Lampropeltis holbrookii* for *Cornella sagi* Holbrook, not of Schlegel (p. 152).

——— Ringduens forekomst omkring Bergen.

Naturen (Bergen), XXVI, Oct., 1902, p. 319.

A brief note on the occurrence of the ring-neck dove (*Columba palumbus*) in the neighborhood of Bergen, Norway,

——— Some generic names of turtles.

Proc. Biol. Soc. Wash., XV., Dec., 16, 1902, pp. 235–238.

Shows that *Sternotherus* is a synonym of *Kinosternon*, and that *Pelusios* must be used for the genus usually known as Sternothœrus; furthermore, that *Emys spengleri* is the type of *Geœmyda* necessitating a new generic name for *G. spinosa*, for which *Heosemys* is proposed.

——— A salamander new to the District of Columbia.

Proc. Biol. Soc. Wash., XV, Dec. 16, 1902, pp. 239–240.

Notes that *Ambystoma maculatum* has been taken at Twining City, D. C.

——— Rediscovery of one of Holbrook's salamanders.

Proc. U. S. Nat. Mus., XXVI, No. 1321, Jan. 29, 1903, pp. 557–558.

The species rediscovered is *Desmognathus quadrimaculata* from the mountains of North Carolina.

——— Description of a new species of Gecko from Cocos Island.

Proc. Biol. Soc. Wash., XVI, Feb. 21, 1903, pp. 3–4.

Described as new: *Sphærodactylus pacificus;* type, U. S. N. M., No. 31057.

——— A new name for the Hawaiian bird genus *Oreomyza.*

Proc. Biol. Soc. Wash., XVI, Feb. 21, 1903, p. 11.

Oreomyza Stejneger being preoccupied, the new name *Oreomystis* is substituted.

——— Ridgway's classification of the Falconiformes.

Science (new series), XVII, Apr. 17, 1903, pp. 628–629.

Shows that Ridgway's classification has been followed in the check list of North American birds published by the American Ornithologists' Union.

STEJNEGER, LEONHARD, and MILLER, GERRIT S., Jr., Plan for a biological survey of the palearctic region.

Yearbook Carnegie Institution, No. 1, 1902, pp. 240–266.

STEJNEGER, LEONHARD, and MILLER, GERRIT S., Jr.—Continued.

An elaborate scheme for a biotic survey of the Old World north of the tropics, presented in response to the invitation of the Carnegie Institution for "suggestions, opinions, and advice as to fields that it ought to occupy and the best methods for carrying forward its work in those fields."

STILES, CHARLES WARDELL. The type species of certain genera of parasitic flagellates, particularly Grassi's genera of 1879 and 1881.

Zool. Anzeiger, Leipz., No. 682, XXV, Sept. 29, 1902, pp. 689–695.

——— Hook-worm disease in the South. Frequency of infection by the parasite (*Uncinaria americana*) in rural districts.

Pub. Health Rep., XVII, No. 43, Oct. 24, 1902, pp. 2433–2434.

A preliminary report to the Surgeon-General, Public Health and Marine-Hospital Service.

——— The significance of the recent American cases of hook-worm disease (uncinariasis or anchylostomiasis) in man.

18th Ann. Rep. Bureau Animal Indust., U. S. Dept. Agric., 1902, pp. 183–219, figs. 113–196.

——— Frogs, toads, and carp (*Cyprinus carpio*) as eradicators of fluke disease.

18th Ann. Rep. Bureau Animal Indust., U. S. Dept. Agric., 1902, pp. 220–222, figs. 197–203.

——— Further investigations on verminous diseases of cattle, sheep, and goats in Texas.

18th Ann. Rep. Bureau Animal Indust., U. S. Dept. Agric., 1902, pp. 223–229.

——— A case of infection with the double-pored dog tapeworm (*Dipylidium caninum*) in an American child.

Am. Medicine, V, No. 2, Jan. 10, 1903, pp. 65–66, figs. 1–7.

——— Report upon the prevalence and geographic distribution of hook worm disease (uncinariasis or anchylostomiasis) in the United States.

Bull. 10, Hyg. Lab., U. S. Pub. Health and Mar.-Hosp. Serv., Feb., 1903, pp. 1–121, figs. 1–86.

——— A parasitic roundworm (*Agamomermis culicis*, n. g., n. sp.) in American mosquitoes (*Culex sollicitans*).

Bull. 13, Hyg. Lab., U. S. Pub. Health and Mar.-Hosp. Serv., May, 1903, pp. 15–17.

STILES, CHARLES WARDELL. The type species of the cestode genus *Hymenolepis*.

Bull. 13, Hyg. Lab., U. S. Pub. Health and Mar.-Hosp. Serv., May, 1903, pp. 19–21.

STILES, CHARLES WARDELL, and HASSALL, ALBERT. *Strongyloides stercoralis*, the correct name of the parasite of Cochin China diarrhea.

Am. Medicine, Phila., IV, No. 9, Aug. 30, 1902, p. 343.

——— *Bertiella*, new name for the cestode genus *Bertia* Blanchard, 1891.

Science (new series), XVI, No. 402, Sept. 12, 1902, p. 434.

——— Index-catalogue of medical and veterinary zoology.

Bull. No. 39, Bureau Animal Indust., U. S. Dept. Agric. Part 1, Authors, A to Azevedo, pp. 1–46 (issued May, 1902); Part 2, Authors, B to Buxton, pp. 47–198 (issued Feb., 1903); Part 3, Authors, C to Czygan, pp. 199–324 (issued May, 1903).

STILES, CHARLES WARDELL, and PFENDER, CHARLES A. The failure of thymol to expel whipworms (*Trichuris depressiuscula*) from dogs.

Journ. Comp. Med. and Vet. Arch., Phila., XXIII, No. 12, Dec., 1902, pp. 733–740.

STONE, WITMER. A collection of birds from Sumatra, obtained by Alfred C. Harrison, jr., and Dr. H. M. Hiller.

Proc. Acad. Nat. Sci. Phila. for 1902 (Jan. 20, 1903), pp. 670–691.

A briefly annotated list of about 140 species obtained in the Padang and Lampong districts of Sumatra. *Rhinomyias umbratilis* (Strickland) is found to be the correct name of the Bornean species, at present known as *R. pectoralis* (Salvadori), and the Sumatran form is described as *Rhinomyias umbratilis richmondi* (p. 686).

TASSIN, WIRT. The Casas Grandes meteorite.

Proc. U. S. Nat. Mus., XXV, No. 1277, Sept. 2, 1902, pp. 69–74, pl. I–IV.

An analysis of the meteoric iron reported as having been found in the ancient Mexican ruins of Casas Grandes in the State of Chihuahua. A bulk analysis is given, together with other determinations of the nickel and cobalt, tending to show that the composition varies on different portions. The following minerals were isolated and analyzed separately: Troilite, schreibersite, taenite; graphitic carbon was also present in small amount, and an undetermined silicate.

THAYER, GERALD H. The coloration and relationships of Brewster's Warbler.

Auk, XIX, No. 4, Oct., 1902, pp. 401–402.

A note showing that the typical bird is without a trace of yellow on the under surface. The relationships of this warbler with *Helminthophila pinus* and *H. chrysoptera* are also discussed.

THOMAS, OLDFIELD. (See under J. A. ALLEN.)

ULKE, HENRY. A list of the beetles of the District of Columbia.

Proc. U. S. Nat. Mus., XXV, No. 1275, Sept. 2, 1902, pp. 1–57.

UNDERWOOD, LUCIEN M., and MAXON, WILLIAM R. Notes on a collection of Cuban Pteridophyta, with descriptions of four new species.

Bull. Torrey Bot. Club, XXIX, Oct., 1902, pp. 577–584, 1 fig.

Notes on a collection made by Messrs. Charles Louis Pollard, William Palmer, and Dr. Edward Palmer, in 1902. *Alsophila gracilis*, *Polypodium cryptum*, *Asplenium venustum*, and *Diplagium aemulum* are described as new. The name *Polystichum aquifolium* is proposed for the homonym *Polystichum ilicifolium* of Fée. *P. cryptum* is figured.

VAUGHAN, T. WAYLAND. Fuller's earth of southwestern Georgia and western Florida.

U. S. Geol. Surv., Mineral Resources for 1901 (1902), pp. 922–934.

Gives a general account of the occurrences of fullers earth in the region covered by the report, with the results of practical tests and analyses made by Dr. Heinrich Ries.

——— Evidence of recent elevation along the westward extension of Florida.

Science (new series), XVI, 1902, p. 514.

Presents evidence which tends to show that the Florida coast south of Tallahassee is rising at a rate of approximately 2 feet a century.

——— An addition to the coral fauna of the Aquia Eocene formation of Maryland.

Proc. Biol. Soc. Wash., XV, 1902, pp. 205, 206.

Reviews the species of Eocene corals of Maryland, and cites an additional species, *Haimesiastræa conferta* Vaughan, from lower Marlborough.

——— A redescription of the coral *Platytrochus speciosus*.

Proc. Biol. Soc. Wash., XV, 1902, pp. 207–209, 5 figs.

The types (two specimens) of this species, named by Gabb and Horn, are redescribed and referred to the genus *Trochocyathus*.

VAUGHAN, T. WAYLAND. Corals of the Buda Limestone.

Bull. U. S. Geol. Surv., No. 205, 1903, pp. 37–40, 89–92, pls. XXVI, XXVII.

The Buda limestone is the uppermost formation of the Cretaceous Comanche Series of Texas. The following species are described, *Parasmilia texana*, sp. nov., *Trochosmilia* (?) sp. indet., Coral sp., *Orbicella* (?) *texana* sp. nov., *Leptophyllia* sp. (No. 1), *Leptophyllia* sp. (No. 2).

——— Fuller's earth deposits of Florida and Georgia.

Bull. U. S. Geol. Surv., No. 213, 1902 (1903), pp. 392–399.

This is practically a republication of the article cited above and published in the Mineral Resources of the U. S. Geological Survey for 1901.

——— Corrections to the nomenclature of the Eocene fossil corals of the United States.

Proc. Biol. Soc. Wash., XVI, 1903, p. 101.

Proposes the generic name *Aldrichiella* for *Aldrichia* Vaughan, preoccupied, and shows that the type species of *Rhectopsammia* Vaughan, is the young of *Endopachys macluri* (Lea). The former generic name is therefore abandoned.

VAUGHAN, T. WAYLAND, HAYES, C. WILLARD, and SPENCER, ARTHUR C. Report on a geological reconnaissance of Cuba, made under the direction of Gen. Leonard Wood, Military Governor.

Ann. Rep. Military Governor of Cuba, 1901, pp. 1–123, pls. XXIX, figs. 16.

Contains the results of a general geological reconnaissance of Cuba and the Isle of Pines, made during March, April, May, and June, 1901, by Dr. C. Willard Hayes, in charge, assisted by Messrs. Spencer and Vaughan. The following chapter or principal section headings give the scope of the work: Geography; Topography, including mountains, plains, drainage; General Geology, including stratigraphic and structural geology and geologic history. The greater portion of the report is devoted to the economic geology. The section headings are Gold, Copper, Lead, Manganese, Iron, Chromium, Bitumen (including asphalt, mineral tar and petroleum), and there are notes on coal, asbestos, salt, and structural materials. A section is devoted to a description of the geology of the Isle of Pines, and numerous elevations along the principal lines of railway are given in an Appendix.

Published also in separate form.

WALCOTT, CHARLES D. Cambrian Brachiopoda: *Acrotreta*, *Linnarsonella*, *Obolus*; with descriptions of new species.

Proc. U. S. Nat. Mus., XXV, No. 1299, Nov. 3, 1902, pp. 577–612.

WALCOTT, CHARLES D.—Continued.

In this paper Doctor Walcott continues his studies of Cambrian brachiopods. He defines the genus *Acrotreta*, 21 new species or new varieties and 12 old species; the new genus *Linnarsonella*, with 2 new and 1 previously described species; *Bröggeria*, a new subgenus of *Obolus*, with 1 species. Of *Lingulella* 4 new and 4 old species are described, and of *Westonia* 1 new species.

WHITE, DAVID. Description of a fossil alga from the Chemung of New York, with remarks on the genus *Haliserites* Sternberg.

Bull. N. Y. State Museum, No. 52, 1901, 1902, pp. 595–610, pls. 3, 4.

The principal specimens described in this paper, which was published in the Report of the State Paleontologist, are from the Chemung strata of East Windsor, Broome County, N. Y., and are referred to a new genus, *Thamnocladus*, and are named *Thamnocladus clarkei*. The new genus is differentiated from *Buthotrephis*, *Psilophyton*, and *Haliserites*, to the latter of which specimens of the new genus have hitherto been referred. The name *Tæniocrada* is proposed for the membranaceous algoid plant conforming to the genus *Haliserites* as defined by Penhallow. The type species is said to be *Tæniocrada lesquereuxii*, formerly illustrated as *Haliserites dechenianus*.

WHITE, DAVID. Memoir of Ralph Dupuy Lacoe.

Bull. Geol. Soc. America, XIII, 1901 (Feb., 1903), pp. 509–515.

In addition to an account of the life of R. D. Lacoe, a bibliography is given and reference made to the collections donated by him to the U. S. National Museum. These collections embraced about 17,000 Paleozoic plant fossils, including over 575 described or figured specimens; 800 Dakota plants, including a large number of types; nearly 5,000 specimens of fossil insects, of which over 200 are types; 400 specimens of fossil vertebrates; a large amount of unpublished plant material, and several thousands of insects partially reported on by Doctor Scudder.

WILSON, CHARLES BRANCH. North American parasitic copepods of the family Argulidæ, with a bibliography of the group and a systematic review of all known species.

Proc. U. S. Nat. Mus., XXV, No. 1302, Nov. 25, 1902, pp. 635–742, pls. VIII–XXVII, 23 text figs.

A comprehensive report on the Argulidæ, comprising a historical sketch, bibliography, an account of their ecology, ontogeny, and morphology, and a systematic review of the species. The following species are described as new: *Argulus niger*, *A. maculosus*, *A. versicolor*, *A. americanus*.

The following references to papers by Dr. Theodore Gill, published between September, 1899, and May, 1902, were not furnished in time to be included with the bibliographies accompanying the reports for those years, and are therefore printed in connection with the Museum bibliography for 1903, at his request.

GILL, THEODORE. Desirability of extension of study of eggs. (Editorial.)

Osprey, IV, No. 1, Sept., 1899, pp. 9–10.

The desirability of extending the study of eggs beyond their shells is urged. The investigations of Valenciennes and Frémy on the contents of the egg, published in 1854, are referred to, and the difference between the reaction to boiling is indicated in the case of the albumen of the Lapwing. Data are asked for as "to the absolute and relative time required by the white and yellow to become hard in boiling, the degree of hardness acquired, and the behavior of white and yellow to reagents." It is also added that "the edibility and taste of eggs of different kinds would also be interesting subjects for investigation."

——— Popular ignorance of birds. (Editorial.)

Osprey, IV, No. 3, Nov., 1899, pp. 43–44.

The wide publication of a note on "A bird with a monkey face" is taken as the text of an editorial on the general ignorance of common birds. The bird in question was a common Barn Owl.

GILL, THEODORE. The largest birds. (Editorial.)

Osprey, IV, No. 4, Dec., 1899, pp. 57–59.

The opinion of J. E. Harting that the *Dinornis maximus* was "the largest known bird that had ever lived" is noted. The *Thrasaetus harpyia*, or Harpy Eagle, is declared to be apparently the largest bird of prey, weighing 28 to 30 pounds. Attention is called to the overlooked fact that the common Turkey may be "the largest bird that flies," as it sometimes may exceptionally attain a weight of 70 pounds. Such a turkey, however, could scarcely fly.

——— Esthetic birds: The Bower Birds of Australia and New Guinea.

Osprey, IV, No. 4, Jan., 1900, pp. 67–71.

A summary of the knowledge acquired respecting the nesting habits of the Bower Birds, or Ptilonorhynchinæ, is given and the "bowers and playing grounds" as well as "nests and eggs" of species described and illustrated by 3 figures representing the Satin Bower Bird and its nest and eggs, as well as the Bower of the Great Bower Bird.

GILL, THEODORE. Origin of the Hawaiian fauna.

Osprey, IV, No. 5, Jan., 1900, p. 78.

An editorial comment on the character of the vertebrate fauna of the Hawaiian Islands in correlation with the ornithology.

——— Esthetic birds: the hut and the garden of the Gardener bird of New Guinea. After Odordo Beccari.

Osprey, IV, No. 6, Feb., 1900, pp. 83–85.

A description is given of "the bird," "the hut," and "the garden" of the Gardener bird, *Amblyornis inornatus*. In an introductory editorial note additional information is given.

——— The origin of the Hawaiian fauna (editorial.)

Osprey, IV, No. 6, Feb., 1900, pp. 90–91.

A continuation of a former editorial article on the same subject, in which the land shell-bearing Gasteropods are considered. The conclusion is reached that "the extent of differentiation and segregation of the predominant Achatinellines almost compels us to believe that their progenitors came upon the islands very early. With the present feeble light to guide us, it seems to be more likely that these progenitors came from the west of the islands." This is in contrast with the indications furnished by the birds as at present understood. We are thus left in an unsettled condition, and must await future more detailed studies.

——— Mercantile value of eggs.

Osprey, IV, No. 7, Mar., 1900, pp. 109–110.

In response to an inquiry why a great auk's egg should be considered more valuable than that of an *Aepyornis*, the circumstances regulating value in the nature of demand and supply are indicated.

——— Love of nature.

Osprey, IV, No. 9, May, 1900, pp. 141–142.

An editorial on the cause and manifestation of love for nature.

——— On the zoo-geographical relations of Africa.

Science (new series), XI, June 8, 1900, pp. 900–901.

An abstract of "a communication to the National Academy of Sciences made April 18, 1900." It is contended that the African fauna "has two sides, facing in opposite directions, and it can not be understood without taking both into consideration." The association of Africa with Asia or Europe is "illogical and falsifies the record." "Whatever facts a classification may be intended to embody, the African fauna must be isolated. If we wish to express, in our terminology, a former condition of affairs, Eogæa is a term adapted to do so."

GILL, THEODORE. Eogæa and Antarctica.

Science (new series), June 8, 1900, p. 913.

A list of articles by the writer on the geographical areas in question.

——— The African tiger fish.

Forest and Stream, LV, June 23, 1900, p. 488.

The African fresh-water "tiger fish," regarded as a superior game fish, is a "member of a genus peculiar to Africa (*Hydroeyon*)," belonging to "the family of Characinids."

——— Significance and etymology of the word mammal.

Osprey, IV, No. 10, June, 1900, pp. 157–159.

The etymology imagined in the Century Dictionary and others is shown to be erroneous. The name *mammalia* is declared to have been formed by Linnæus in analogy with *Animalia*, from the word *mamma* with the suffix *alia*. The singular, consequently, should be *mammal* and not *mammale*. The history of the anglicized form mammal and Mammifer is also indicated.

——— Edward Drinker Cope.—Herpetological and ichthyological contributions.

Proc. Am. Philosoph. Soc., Memorial Volume, I, 1900, pp. 274–296 (Printed Aug. 3, 1900).

An address delivered at a meeting in memory of Edward Drinker Cope, in the hall of the American Philosophical Society, held at Philadelphia, Nov. 12, 1897, under the auspices of eight institutions with which Cope had been intimately connected.

The nature of the contributions and the influence which they exerted on the sciences under consideration are set forth.

——— Correspondence of and about Audubon and Swainson.

Osprey, V, No. 2, Nov. and Dec., 1900, pp. 23–35.

A summary is given of the letters from Audubon to Swainson, written between 1829 and 1838, and preserved in the collections of the Linnæan Society of London; comments are given on the relations of the naturalists of that period. In an editorial in the same volume (pp. 29–30) further comments are added.

——— Titles of magazines and collections.

Osprey, V, No. 4, Mar. and Apr., 1901, p. 62.

Comments are made on the titles on various magazines and collections.

——— Names of magazines.

Osprey, V, No. 5, May, 1901, pp. 77–78.

The discussion of the subject commenced in the preceding number of the *Osprey* is continued and suggestions for improvement offered.

GILL, THEODORE. The proper name of Bdellostoma or Heptatrema.

Proc. U. S. Nat. Mus., XXIII, No. 1234, June 6, 1901, 735–738.

The name Heptatrema is traced back to its origin and the history of the nomenclature of the genus detailed. It is shown that the earliest name was *Eptatretus* (1819) and that consequently the family name should be *Eptatretidæ*.

——— Note on the genus *Hollandia* of Karsh.

Science (new series), XIII, June 14, 1901, pp. 949–950.

The name *Hollandia*, having been applied in 1892 to one genus, could not be given to a second, and consequently the genus of butterflies named *Hollandia* by Karsch in 1897 is renamed Hollandella. The family *Holandiidæ* is degraded to the rank of a subfamily named *Hollandellinæ*.

——— The popularity of White's Selborne.

Osprey, V, No. 7, July, 1901, p. 107.

In view of the publication of over a hundred editions (and of three within the past year), an inquiry is instituted into the cause of the popularity of Gilbert White's celebrated work.

——— Nomenclature at Berlin.

Osprey, V, No. 8, Aug., 1901, pp. 126–127.

Comments are made on some of the rules promulgated by the recent Zoological Congress at Berlin, as well as certain names published by French ornithologists. The criticized names are such as were formed by "compounding the first part or syllables of one word and the final elements of another," such as *Embernagea* composed of *Ember*[*iza*] and [*Ta*]*nagra*.

——— The Osprey or Fishhawk; its characteristics and habits.

Osprey, V, in the following numbers: No. 1, Sept., 1900, pp. 11–12; No. 2, Nov., 1900, pp. 25–28; No. 3, Jan., 1901, pp. 40–42; No. 4, Mar., 1901, pp. 60–61; No. 5, May, 1901, pp. 73–76; No. 6, June, 1901, pp. 92–93; No. 7, July, 1901, pp. 105–106; No. 8, Aug., 1901, pp. 124–125; No. 9, Sept., 1901, p. 141 (end).

——— Life and Letters of Thomas Henry Huxley. By his son, Leonard Huxley. [A review.]

Osprey, V, No. 3, Jan. and Feb. 1901, pp. 47–48.

——— Work and worry for the classicists.

Osprey, V, No. 9, Sept., 1901, pp. 142–143.

An editorial on nomenclature induced by some remarkable names recently published involving given and family names, such as *Edvardocopeia* after Edward D. Cope. Incidentally some other curious names are referred to, especially a number of familiar bird and crustacean names which are evidently anagrams of previous ones. A fact, not previously recognized, is that nearly a dozen names of crustaceans (*Cirolana*, *Aniloera*, *Corilana*, etc.) are simply anagrams of *Caroline* or *Carolina*.

GILL, THEODORE—Continued.

——— Alewives.

Notes and Queries (9), VIII, No. 206, Nov. 30, 1901, pp. 451–452.

In answer to a previous inquiry (Vol. VII, p. 406) the etymology and true name of the American Alewife are given. In correction of the great New England Dictionary it is remarked that Alewife was and still is a name applied in some places in England to one of the Shads, and quite naturally it was brought over to the United States by the immigrants from England. Aloofe, given as an etymon and an Indian name, is nothing but Aloose, the antique s having been mistaken for an f. Aloose, Alose, and Alice, as well as Alewife, are derivatives from the old Latin *Alosa*.

——— William Swainson and his times.

Osprey, IV, V, in following numbers: (I) IV, No. 7, Mar., 1900, pp. 104–108; (II) IV, No. 8, Apr., 1900, pp. 120–123; (III) IV, No. 9, May, 1900, pp. 135–138; (IV) IV, No. 10, June, 1900, pp. 154–156; (V) IV, No. 11, July, 1900, pp. 166–171; (VI) V, No. 1, Sept., 1900, pp. 8–10; (VII) V, No. 3, Jan., 1901, pp. 37–39; (VIII) V, No. 4, Mar., 1901, pp. 58–59; (IX) V, No. 5, May, 1901, pp. 71–72; (X) V, No. 9, Sept., 1901, pp. 136–137; (XI) V, No. 10, Oct., 1901, pp. 152–155; (XII) V, No. 11, Nov., 1901, pp. 167–172; (XIII) V, No. 12, Dec., 1901, pp. 176 (end).

——— General history of birds.

Osprey, VI, in the following numbers: (I), Jan., 1902, pp. 1–4; (II), Feb., 1902, pp. 5–12; (III), Mar., 1902, pp. 13–14; (IV), Apr., 1902, pp. 15–20; (V), May, 1902, pp. 21–26; (VI), June, 1902, pp. 27–34; (VII), July, 1902, pp. 35–42.

The chapters of a general work.

In Chapter I are considered: (p. 1–4) "The English names;" (4–5) "The bird's place in nature;" (5–6) "Characters of the class;" (7–8) "The general characters of birds;" (8) "The plumage of birds;" (8–10) "The feathers of birds;" (10–13) "The arrangement of feathers;" (13, 14) "The color of the plumage;" (15–17) "Moulting or molting;" (17–19) "Molting periods;" (19–20) "Individual molt;" (20–21) "Color change without molt."

In Chapter II are discussed: (p. 21) "General anatomy;" (33–35) "The muscles;" (35–37) "The brain and the rest of the nervous system;" (37–38) "The alimentary system;" (38–39) "The vascular system;" (39–40) "The respiratory system;" (40) "The generative system."

In Chapter III is treated the "Ecology of birds" under separate headings, viz: (10–41) "Contrast between uniformity of structure and variety of habits;" (41–42) "Variation in flight."

GILL, THEODORE. Life and ornithological labors of Sir John Richardson.

Osprey, VI, No. 1, Jan., 1902, pp. 13–17, with portrait plate.

Richardson's characteristics are considered under two categories: (1) "His life" and (2) "His ornithological work."

——— Biographical notice of John Cassin.

Osprey, VI, No. 3, Mar. 1902, pp. 50–53.

An account is given of Cassin's personal characteristics.

——— The works of John Cassin.

Osprey, VI, No. 5, May, 1902, pp. 80–84.

A chronological summation of contributions to societies, and full titles of separately published works are given.

GILL, THEODORE, and SMITH, HUGH M. The Moringuoid eels in American waters.

Science (new series), XI, June 22, 1900, pp. 973–974.

The Moringuoid eels have been hitherto found only in the seas of India and the Molucca-Indian archipelago. A species of one of the genera, *Aphthalmichthys*, was recently discovered at Porto Rico and is named *A. caribbacus*. The *Stilbiscus edwardsii*, referred by Jordan and Evermann to the family *Murænesocidæ*, is a species of *Moringua*. *Leptoconger* and *Gordiichthys* also belong to the family Moringuidæ.

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PART II.

PAPERS DESCRIPTIVE OF MUSEUM BUILDINGS.

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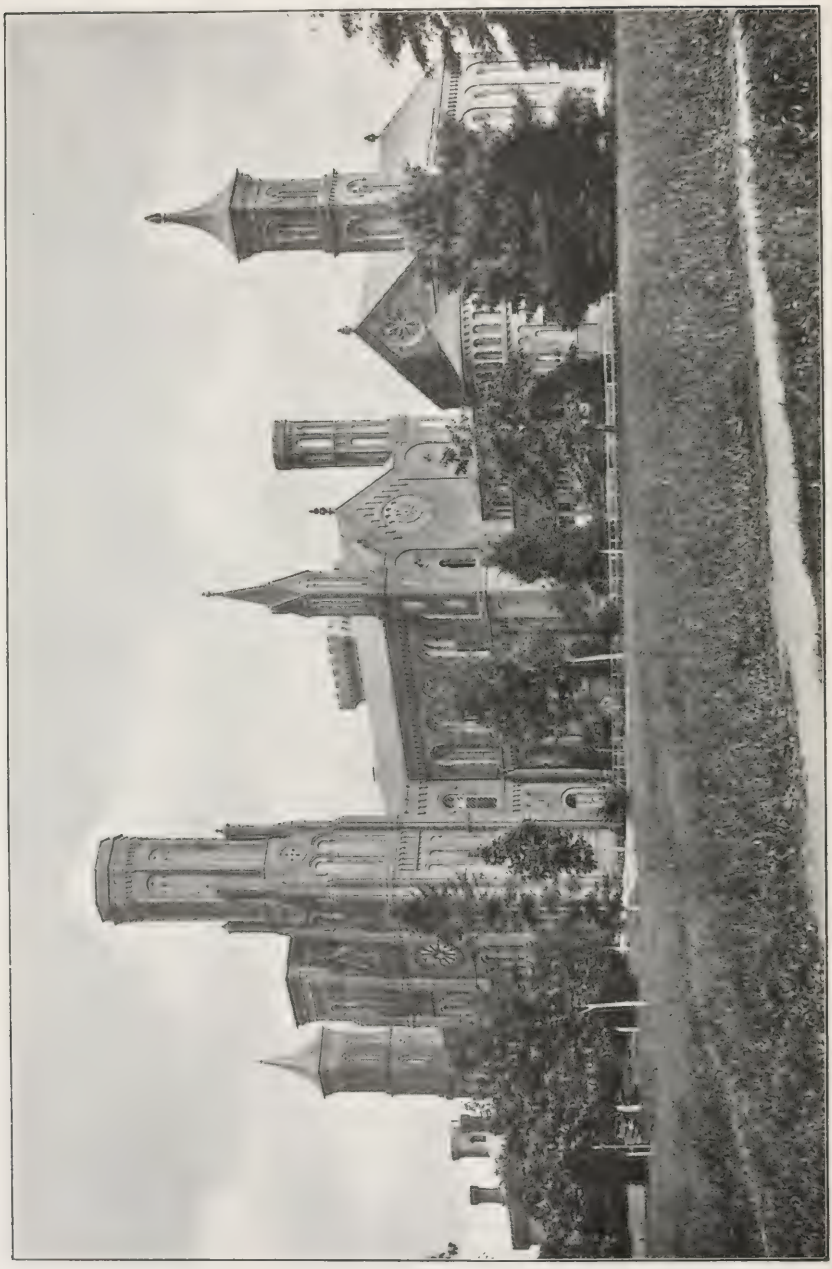

NORTH FRONT OF THE SMITHSONIAN INSTITUTION BUILDING.

From a photograph taken in 1871.

THE UNITED STATES NATIONAL MUSEUM: AN ACCOUNT OF THE BUILDINGS OCCUPIED BY THE NATIONAL COLLECTIONS.

By

RICHARD RATHBUN,

Assistant Secretary of the Smithsonian Institution, in charge of the U. S. National Museum.

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THE UNITED STATES NATIONAL MUSEUM: AN ACCOUNT OF THE BUILDINGS OCCUPIED BY THE NATIONAL COLLECTIONS.

By Richard Rathbun,
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INTRODUCTION.

The object of this paper is to briefly describe the history and character of the several buildings in which the science and art collections belonging to this Government have been housed and cared for, the time for such an account seeming especially opportune, in view of the recent beginning of an additional, larger, and more elaborate structure to meet the demands for increased space. No attempt is made to contrast the present accommodations with those provided elsewhere for a like purpose, only such criticisms being offered as are directly suggested by the buildings themselves.

The scope of the U. S. National Museum, as defined by acts of Congress, is exceedingly broad, including, besides natural history, geology, archæology and ethnology, the various arts and industries of man. Its development, resulting largely from Government explorations, has been greatest in the four subjects first mentioned. The collections illustrating the industrial arts, though now mainly in storage, are nearly as extensive in the amount of exhibition space required, and they can be rapidly enlarged and perfected as soon as a place is found for them.

Since the seventh decade of the last century the Museum has been continuously in a state of congestion, and with ever increasing accessions, it early became necessary to resort to outside storage, in which the amount of material is now extremely large. The demand for additional room, therefore, dates back over twenty years, being based partly on the need of placing these valuable collections under safe conditions and partly on the important requirement of bringing them into service by classification and arrangement. Last year an important step in this direction was realized—the passage of an act of Congress under which a more commodious and worthy building will speedily be secured.

As to the suitability for museum purposes of the existing buildings it may be said that the Smithsonian building was erected before much was known of museum needs, and it was moreover designed only in part for museum use. Its public halls, though exhibiting many important defects, have as a whole served their purpose well. The accommodations for laboratories and the storage of reserve collections are, on the other hand, very poor, being mainly found in basement and small tower rooms, inconvenient and badly lighted.

The Museum building, constructed soon after the Centennial Exhibition of 1876, primarily for the extensive collections brought to Washington from that source, was put up hastily and cheaply, and therefore not as substantially as was advisable. It is practically one great exhibition hall, since its partition walls are pierced at frequent intervals with broad and high arched openings. The lighting in the main is not unsatisfactory, though with a different roof construction it could be much improved. Here again, however, fault is to be found with the space available for workrooms and storerooms, since, having practically no basement, these rooms are confined to the towers and pavilions.

In planning the new granite building an opportunity is offered for correcting these faults. Good and convenient laboratories and storage rooms have been provided for, and it is intended that the exhibition halls shall show a decided improvement over those in the older structures.

The history of the buildings is briefly as follows:

In 1840 a society was organized in the city of Washington under the name of the National Institution, afterwards changed to the National Institute, among whose objects was the direction of the Smithson bequest, then under discussion by Congress, and the bringing together of collections in natural history, ethnology, and such other subjects as fall within the scope of a general museum. Its membership included many prominent persons, among them members of the Government and of Congress, which gave to the society a recognized position and secured to its purposes extensive quarters in the building of the Patent Office. Here were assembled the many valuable specimens brought home by the famous United States Exploring Expedition around the world, as well as others derived from both Government and private sources, which formed the nucleus of the present national collections, soon to pass under other control.

Under date of December 6, 1838, the President announced to Congress the receipt in this country and the investment of the Smithson bequest, amounting to a little more than half a million dollars, and also invited the attention of that body to the obligation devolving upon the United States to fulfill the objects of that bequest. During the seven and three-quarters years which ensued to the time of the actual

foundation of the Smithsonian Institution, this matter was constantly before Congress, the subject of numerous propositions and of extended debates. By the will of Smithson the city of Washington was to be the home of the establishment, but the character and extent of its buildings, as well as their site, depended upon the policy which Congress might adopt for carrying out the wishes of the benefactor, so tersely yet wisely expressed.

The bill which was finally passed and received the approval of the President on August 10, 1846, gave to the Smithsonian Institution the custody of the national collections, and provided for a site and building in the following terms:

AN ACT To establish the "Smithsonian Institution," for the increase and diffusion of knowledge among men.

SEC. 4. *And be it further enacted*, That, after the board of regents shall have met and become organized, it shall be their duty forthwith to proceed to select a suitable site for such building as may be necessary for the institution, which ground may be taken and appropriated out of that part of the public ground in the city of Washington lying between the patent office and Seventh Street: *Provided*, The President of the United States, the Secretary of State, the Secretary of the Treasury, the Secretary of War, the Secretary of the Navy, and the Commissioner of the Patent Office, shall consent to the same; but, if the persons last named shall not consent, then such location may be made upon any other of the public grounds within the city of Washington, belonging to the United States, which said regents may select, by and with the consent of the persons herein named; and the said ground, so selected, shall be set out by proper metes and bounds, and a description of the same shall be made, and recorded in a book to be provided for that purpose, and signed by the said regents, or so many of them as may be convened at the time of their said organization; and such record, or a copy thereof, certified by the chancellor and secretary of the board of regents, shall be received in evidence, in all courts, of the extent and boundaries of the lands appropriated to the said institution; and, upon the making of such record, such site and lands shall be deemed and taken to be appropriated, by force of this act, to the said institution.

SEC. 5. *And be it further enacted*, That, so soon as the board of regents shall have selected the said site, they shall cause to be erected a suitable building, of plain and durable materials and structure, without unnecessary ornament, and of sufficient size, and with suitable rooms or halls, for the reception and arrangement, upon a liberal scale, of objects of natural history, including a geological and mineralogical cabinet; also a chemical laboratory, a library, a gallery of art, and the necessary lecture rooms; and the said board shall have authority, by themselves, or by a committee of three of their members, to contract for the completion of such building, upon such plan as may be directed by the board of regents, and shall take sufficient security for the building and finishing the same according to the said plan, and in the time stipulated in such contract; and may so locate said building, if they shall deem it proper, as in appearance to form a wing to the patent office building, and may so connect the same with the present hall of said patent office building, containing the national cabinet of curiosities, as to constitute the said hall, in whole or in part, the deposit for the cabinet of said institution, if they deem it expedient to do so: provided, said building shall be located upon said patent office lot, in the manner aforesaid: *Provided, however*, That the whole expense of the building and enclosures aforesaid shall not exceed the amount of ———, which sum is hereby appropriated, payable out of money in the treasury not otherwise appropriated,

together with such sum or sums out of the annual interest accruing to the institution, as may, in any year, remain unexpended, after paying the current expenses of the institution. And duplicates of all such contracts as may be made by the said board of regents shall be deposited with the treasurer of the United States; and all claims on any contract made as aforesaid shall be allowed and certified by the board of regents, or the executive committee thereof, as the case may be, and, being signed by the chancellor and secretary of the board, shall be a sufficient voucher for settlement and payment at the treasury of the United States. And the board of regents shall be authorized to employ such persons as they may deem necessary to superintend the erection of the building and fitting up the rooms of the institution. And all laws for the protection of public property in the city of Washington shall apply to, and be in force for, the protection of the lands, buildings, and other property, of said institution. And all moneys recovered by, or accruing to, the institution, shall be paid into the treasury of the United States, to the credit of the Smithsonian bequest, and separately accounted for, as provided in the act approved July first, eighteen hundred and thirty-six, accepting said bequest.

SEC. 6. *And be it further enacted*, That, in proportion as suitable arrangements can be made for their reception, all objects of art and of foreign and curious research, and all objects of natural history, plants, and geological and mineralogical specimens, belonging, or hereafter to belong, to the United States, which may be in the city of Washington, in whosesoever custody the same may be, shall be delivered to such persons as may be authorized by the board of regents to receive them, and shall be arranged in such order, and so classed, as best [to] facilitate the examination and study of them, in the building so as aforesaid to be erected for the institution; * * *

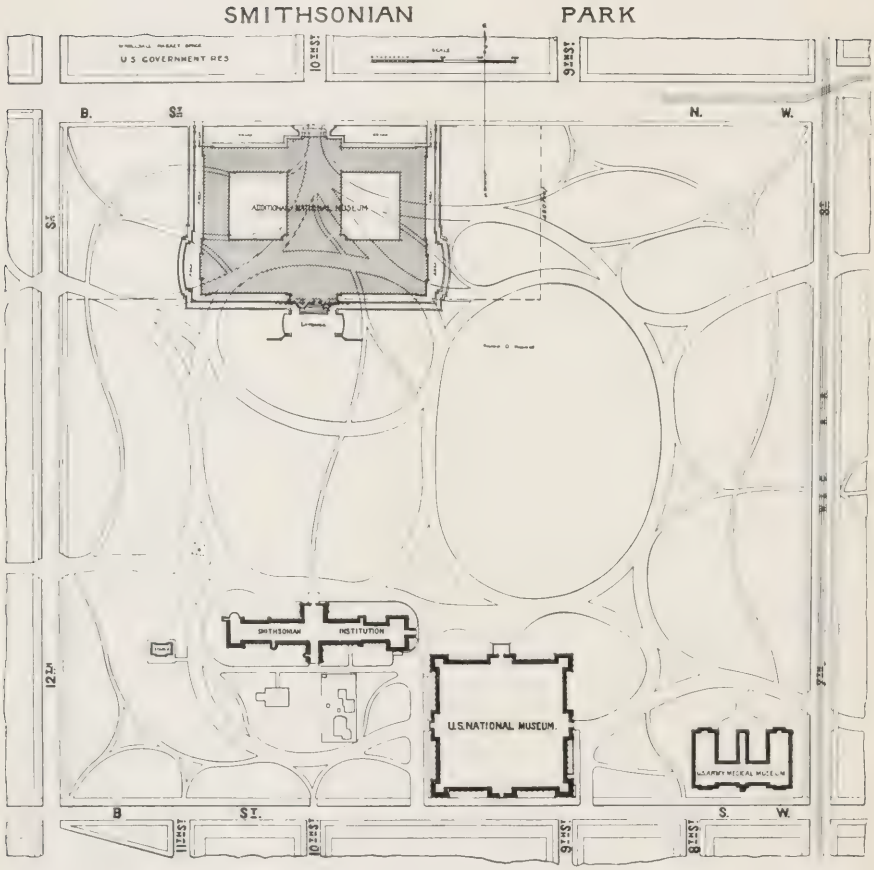
SEC. 7. *And be it further enacted*, That the secretary of the board of regents shall take charge of the building and property of said institution. * * *

(Statutes IX, 102. See also The Smithsonian Institution. Documents relative to its origin and history, 1835–1899. I, pp. 429–434.)

The Smithsonian building, as is well known, was placed upon the Mall. It was planned with reference to accommodations for a museum, a library, and other purposes, but the transfer of the specimens from the Patent Office did not take place until 1858, when Congress began to make small appropriations for the maintenance of the museum feature. The collections increased so rapidly that by 1875 they were occupying fully three-fourths of the Smithsonian building, and, in fact, all parts not actually required for the activities of the parent institution, the administrative offices, and the exchange service.

The Centennial Exhibition at Philadelphia, from which so large a quantity of valuable objects was acquired that they had to be stored provisionally in the so-called "Armory building," which they completely filled, led to the erection of the present Museum building. It proved inadequate from the beginning, and for many years new collections have been accumulating in outside rented buildings, mere storehouses of brick and wood.

After a lapse of twenty-five years Congress has again appropriated funds to extend the quarters, but this time on a far more liberal scale, which will permit of the erection of a much larger and more substantial structure, presenting a dignified exterior, in better keeping with the other permanent buildings of the Government. It will also stand



PLAN OF THE SMITHSONIAN PARK, SHOWING LOCATION OF THE PRESENT BUILDINGS, AND SITE OF THE NEW MUSEUM BUILDING, NOW IN COURSE OF ERECTION.

on the Mall, but along its northern edge, directly facing the Smithsonian building. Upon its completion, the Museum will be in occupancy of a group of three buildings, counting a part of the Smithsonian as one, and it may safely be predicted that none will long contain any vacant space.

THE SMITHSONIAN GROUNDS.

In a bill for the organization of the Smithsonian Institution, prepared by Representative John Quincy Adams, and presented to the United States Senate on February 18, 1839,[a] provision was made for an astronomical observatory, to be erected under the direction of the Secretary of the Treasury upon land belonging to the United States, which, after its selection, should be granted for the purpose and conveyed as a deed of gift to the trustees of the Institution. The locality known as Camp Hill, near the banks of the Potomac River and the mouth of Rock Creek, opposite Analostan Island, seems to have been under consideration at that time. It was the same site that Washington had designated for the National University, and was subsequently used for the object Mr. Adams had in mind, but under the direction of the United States Naval Establishment.

In another bill, introduced in the Senate by Lewis F. Linn, on February 10, 1841,[b] it was proposed that the entire tract known as the Mall be appropriated for the uses of the Smithsonian Institution, with the provision that the buildings should be erected in accordance with plans prepared by and under the supervision of the National Institution, to be approved by the President of the United States. In bills submitted to the same body in June and December, 1844, by the Library Committee, consisting of Senators Rufus Choate, Benjamin Tappan, and James McP. Berrien, appeared the first definite characterization of the building, which was to be placed upon a site to be selected in that portion of the Mall lying west of Seventh street.

The bill for the establishment of the Smithsonian Institution which finally passed Congress and received the approval of the President on August 10, 1846,[c] was drafted by Representative Robert Dale Owen. The sections relating to the site and building are quoted on pages 183 and 184 of the introduction.

Upon the organization of the Board of Regents attention in regard to the site seems first to have been directed toward the Mall, and here its location was finally established, though not without some difficulties and delay, the choice being subject to approval by the President of the United States, the Secretaries of State, the Treasury, War, and the Navy, and the Commissioner of Patents. At a meeting of the Regents on September 9, 1846, the chancellor, the Secretary, and the

[a] Senate bill 293, 1839. [b] Senate bill 245, 1841. [c] Statutes IX, 102.

executive committee, five in all, were constituted a committee on grounds and buildings, whose first report, submitted on November 30 of the same year, resulted in the passage of the following resolution:

That the Regents of the Smithsonian Institution do select and adopt as a site for their buildings so much of the Mall, in the city of Washington, as lies between Seventh street and the river Potomac, if the consent of the persons named in the fourth section of the act to establish the Smithsonian Institution for the increase and diffusion of knowledge among men be obtained thereto; and that upon such consent being obtained in due form, the Secretary is hereby instructed to cause the said ground so selected to be set out by proper metes and bounds.

On December 1 following the Board amended the above resolution by adding the following clause after the word Potomac:

Subject to the power of Congress to grant any portion of the same west of Fourteenth street to the Washington Monument Society for the purpose of erecting a monument thereon.

As consent to this proposition was not obtained, it was resolved by the Regents on December 9:

That a committee of three be appointed by the chancellor to confer with the President of the United States and the other persons named in the fourth section of said act, and ask their consent to the selection by said Regents of that portion of said reservation lying between Seventh and Twelfth streets west, in said city, as the site for the necessary buildings of said institution; and, if such consent be given—

It is further resolved, That said buildings be located thereon, and at least two hundred and fifty feet south of the centre thereof.

The committee designated consisted of Representatives Hough and Owen and Senator Evans, but failing in the object of their mission, the Board resolved, on December 23:

That the Regents of the Smithsonian do select and appropriate as the site for their buildings the south half of so much of the "Mall," in the city of Washington, as lies between Ninth and Twelfth streets.

The consent to this choice by the President and other persons named in the fourth section of the fundamental act was communicated to the Board on January 20, 1847, and the further provisions of the act were then carried out, namely:

And the said ground so selected shall be set out by proper metes and bounds, and a description of the same shall be made, and recorded in a book to be provided for that purpose, and signed by the said Regents, or so many of them as may be convened at the time of their said organization; and such record, or a copy thereof, certified by the chancellor and Secretary of the Board of Regents, shall be received in evidence, in all courts, of the extent and boundaries of the lands appropriated to the said Institution; and upon the making of such record such site and lands shall be deemed and taken to be appropriated, by force of this act, to the said Institution.

After the close of these proceedings, however, which at the time seemed to be conclusive and did finally prevail, the subject of a site was again reopened and led to further inquiries and considerations. These can best be told in the words of the late Dr. George Brown

Goode, as recorded in his paper on the Smithsonian Building and Grounds.[a]

After the present site had been selected there appears to have been some dissatisfaction in regard to it; nor is this to be wondered at, since at that time the Mall was remote from the inhabited portion of the city, being a part of what was then known as "The Island," now called South Washington. This portion of the city was cut off by an old and unsightly canal running to the Potomac and crossed by simple wooden bridges at four points between the Capitol and the Potomac River. It was unfenced and waste, occupied from time to time by military encampments and by traveling showmen. After the completion of the east wing in 1850, when the first lectures were held in the Institution, the Regents were obliged to build plank walks for the accommodation of visitors. Indeed, with the exception of the Capitol grounds and those surrounding the Executive Mansion, the open places in the city were entirely unimproved.

Soon after the selection of the present site the question was reconsidered by the Board, and a committee appointed to obtain, if possible, another location. In the bill as it finally passed Congress permission had been given to locate the building on the space between the Patent Office and Seventh street, now occupied by the building used for the offices of the Interior Department. This was partly to enable the Institution to utilize for its collections the large hall in the Patent Office then assigned to the "National Cabinet of Curiosities," partly, no doubt, to secure a more central location. To obtain this ground, however, it was necessary to have the approval of the President of the United States and other public officials, which was not found practicable. The committee fixed upon Judiciary Square, an open space of rough ground, in which at that time the city hall (a portion of the present structure), the infirmary, and the city jail were located. Though the adjoining streets were entirely vacant, this site was regarded as much more accessible than the Mall.

A proposition was submitted to the common council of the city of Washington, that the site of the city hall should be resigned for the use of the Smithsonian Institution upon its offering to pay to the city $50,000, a sum deemed sufficient to erect a building for the use of the city government upon the site south of Pennsylvania avenue, between Seventh and Ninth streets, now occupied by the Center Market. A bill was introduced into Congress, authorizing the Regents to purchase the city hall, but the common council refused to consider the proposition and the site of the Mall was used.

That part of the Mall appropriated to the Institution has been known as the Smithsonian reservation, while to the entire square between Seventh street and Twelfth street, west, including the reservation, the name Smithsonian Park has been commonly applied.

At their meetings of December 4, 1846, and January 28, 1847, the Regents appropriated a total sum of $4,000 for grading, laying out, and planting the grounds of the Institution, under the direction of the building committee, which was also authorized to expend not over $10,000 in the construction of a permanent fence around the grounds. The latter, however, was erected for less than $500.

In 1848, the building committee entered into a contract with John Douglas, of Washington, to the extent of $1,050 for inclosing the reservation with a hedge and for planting trees and shrubs. The

[a] The Smithsonian Institution, 1846–1896. The History of its First Half Century, pp. 247–264.

architect of the building marked out the paths and roads and indicated the positions of the trees and shrubs, to comprise about 160 species, principally American. The surrounding hedge was to consist on each of the four sides, respectively, of pyrocanthus, osage orange, cherokee rose, and hawthorn. Although considerable progress in this work seems to have been made during the year, the contract was considered not to have been properly complied with, and it was canceled in 1849.

The same year, for the convenience of those who attended the lectures in the east wing of the Smithsonian building, a walk was built from Seventh street to the eastern gate of the grounds and the path from the Twelfth Street Bridge was repaired. In speaking of the considerable expense which such improvements outside the reservation entailed upon the Institution, Secretary Henry, in his report for 1849, said:

> It is hoped that the authorities of the city of Washington will cause bridges to be erected across the canal and walks to be constructed through the public grounds, to facilitate the approach to the building, and that the Institution will not be expected to provide accommodations of this kind.

In their report for 1850, the building committee stated that up to the end of that year $3,747.51 had been spent upon the grounds, and that probably little more expenditure on that account would be necessary. Portions of the roads about the building had been graded and many trees and shrubs set out. An appropriation having been made by Congress for the purpose, Mr. Andrew J. Downing, at the request of the President, was then preparing a plan for converting the entire Mall, including the Smithsonian grounds, into a landscape garden. If this plan were adopted, the Smithsonian lot would form part of an extended park, of which the Smithsonian building, by its site and picturesque style of architecture, would be a prominent and attractive feature.

In 1851, according to the report of the same committee, the Mall was in course of rapid improvement under Mr. Downing. The corporation of the city appropriated $2,500 for an iron bridge across the canal at Tenth street, and a gravel walk was carried thence to the building. The Smithsonian reservation of 19 acres had been inclosed with a fence and planted with trees at an expense to the Institution of about $4,000, but the execution of Mr. Downing's plan, at the cost of the General Government, would, in the view of the committee, render unnecessary any further disbursements by the Institution. Without surrendering the right of use of the reservation appropriated to the Institution, the partition fence between it and the other part of the Mall had been removed and the whole given in charge of Mr. Downing.

Although relieved at this period, and at its own request, of the care and improvement of its grounds, which have since remained under the

supervision of the officer in charge of public grounds, the Institution has always maintained a deep interest in the condition of its surroundings, and has in fact aided materially toward their betterment, as frequently noted in the reports of Secretary Henry and his successors.

In 1855 Professor Henry wrote that since the death of the lamented Downing but little had been done to complete the general plans of the improvement of the Mall proposed by him and adopted by Congress, although an annual appropriation had been made for keeping in order the lot on which the Smithsonian building is situated. Regret was expressed that Congress had not made an appropriation to promote the suggestion of Dr. John Torrey and other botanists of establishing here an arboretum to exhibit the various ornamental trees of indigenous growth in this country.

This scheme was never more than tentatively carried out, but in 1899 the Secretary of Agriculture revived the subject, in his annual report, from which the following extract is taken:

One of the needs of the Department is an aboretum in which can be brought together for study all the trees that will grow in the climate of Washington. The need of such an establishment was felt early in the history of the capital and was brought forward more than fifty years ago among the various plans proposed for the use of the Smithson bequest, which was finally devoted to the founding of the present Smithsonian Institution. In the report of the building committee of that Institution for 1850 the following statement occurs:

"Mr. Downing, the well-known writer on rural architecture, at the request of the President, is now preparing a plan for converting the whole Mall, including the Smithsonian grounds, into an extended landscape garden, to be traversed in different directions by graveled walks and carriage drives and planted with specimens, properly labeled, of all the varieties of trees and shrubs which will flourish in this climate."

This admirable plan, apparently from lack of financial support from Congress, was never systematically prosecuted, and the plantings at first made were so neglected that the nurse trees themselves are now being rapidly broken down and destroyed by storm, disease, and decay. When the grounds of the Department of Agriculture were laid out, in 1868, Mr. William Saunders, then, as now, horticulturist of the Department, established a small arboretum commensurate with the size of the grounds. An arboretum in this climate, however, requires an area of several hundred acres. The time has come when the economic needs of the Department and the education and pleasure of the people demand a rich collection of trees planted so as to secure the best effects of landscape art, furnishing complete materials for the investigations of the Department of Agriculture, and so managed as to be a perennial means of botanical education. We are now engaged in introducing useful trees from all parts of the world, such as those producing fruits, dyes, nuts, oils, and tans, those useful for ornamental purposes, and especially those promising shade, shelter, and fuel in the arid region.

At the present time we have no central place in which to plant and maintain a series of these trees for study and propagation. The importations must be sent out as fast a they are received, without any opportunity for our investigators to make any observations on their behavior under cultivation, and in the case of small and valuable importations subjecting the whole stock to the possibility of total loss. In view of these conditions, I wish to bring to the attention of Congress the importance

of placing at the disposal of this Department an area of suitable size and situation for a comprehensive arboretum. In order to give a specific basis for consideration of this project, I suggest that the area known as the Mall be set aside for this purpose.

"No part of the public domain," said Professor Henry in 1856, "is more used than the reservation on which the Smithsonian building stands, but as yet no special appropriation has been made by Congress for continuing the improvement of the grounds, and it is to be regretted that years should be suffered to pass without planting the trees which are in the future to add to the beauty, health, and comfort of the capital of the nation." In the same connection mention is made of the beautiful monument erected that year near the Institution by the American Pomological Society to the memory of Downing a just tribute to the worth of one of the benefactors of our country. The adoption of his ornamental plan for the public parks of this city was in part due to the example of the Regents in embellishing the grounds around the Smithsonian building.

In 1858 Professor Henry remarked that—

The proposition to supply the public grounds with a complete series of American trees has long been contemplated, but as no appropriation has been made by Congress for this purpose, the Patent Office, conjointly with the Institution, has taken the preliminary steps by issuing a circular asking for seeds of every species of our forest trees and shrubs that would be likely to thrive in this latitude. This circular has been widely distributed, and it is hoped will meet with a favorable response from all who are interested in making more generally known, and in introducing into more extensive cultivation, the natural ornamental products of our own soil. The seeds are to be sent by mail to the Commissioner of Patents and placed in charge of the officers having the care of the public grounds.

In 1862 Professor Henry reported that the trees and shrubbery in the grounds were growing finely under the care of the commissioner of public grounds, B. B. French, esq. He also called attention to the city canal forming the boundary of the Smithsonian grounds on the north, and across the basin or widest part of which most of the visitors to the Institution had to pass. This basin, since the introduction of Potomac water, had become the receptacle of the sewage of the city, and was then an immense cesspool, constantly emitting noxious effluvia prejudicial to the health and offensive to the senses of all who approached the locality. Certain methods of abating the nuisance were suggested.

As before noted, the fence and hedge which originally marked the outlines of the Smithsonian reservation were removed in the time of Downing, thus destroying all visible traces of its limits. On the south this reservation is bounded by B street south, on the west by Twelfth street west. Its depth from B street is 759 feet 9 inches and its length from Twelfth street 1,086 feet 8 inches, its eastern line coinciding with the western line of Ninth street. Its area, therefore, amounts to about 825,590 square feet, or a little less than 19 acres.

The Smithsonian building occupies a central position in the reservation, its main entrance being on the axis of Tenth street extended. The Museum building, finished in 1881, stands 50 feet to the eastward of the Smithsonian building, with its front face nearly on a line with the rear face of the latter. It extends back to B street south, and on the east overreaches by about 65 feet the limits of the reservation. There still remains at the southwest corner of the reservation, bordering on B and Twelfth streets, sufficient space for another structure of smaller size than the Museum building, should it ever be considered advisable to make such use of it, but otherwise all new buildings must be placed outside of the reservation.

The Army Medical Museum, erected in 1886, at the corner of B and Seventh streets southwest, is the only other structure in the Smithsonian park, and further extensive building operations within this square must be carried to its northern side. Such action has been necessary in regard to the additional large building for the National Museum authorized by Congress in 1903, the center of which, like that of the Smithsonian building, will be on a line with the axis of Tenth street.

As to the present condition of the park it may be said that all traces of the old canal and creek have long since disappeared, and fairly good paths and driveways now lead to the Smithsonian and Museum buildings. Unfortunately, however, no improvement can be noted in regard to the trees and shrubs, which were to be made so prominent a feature. None have been planted for many years, and the older ones are dying out or being destroyed by natural causes, much injury having been produced by severe storms. There has been a constant trimming and cutting down, but no attempt to add or build up in this direction, and the general effect is of a park lacking care and cultivation.

THE SMITHSONIAN BUILDING.

HISTORICAL ACCOUNT.

In his account of the Smithsonian building and grounds,[a] the late Dr. George Brown Goode has said:

> That the Smithsonian Institution, before it could begin active operations, must have a home of its own, would doubtless have been regarded as a necessity by any one considering the requirements of the future. Richard Rush, however, appears to have been the first to state this idea in words, which he did in a letter addressed, November 6, 1838, to the Secretary of State, in response to a request of the President for suggestions in regard to the proper manner of carrying out the bequest. * * *
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> In bills introduced in the Senate in June and December, 1844, by the Library Committee—Rufus Choate, Benjamin Tappan, and James McP. Berrien—appeared the first definite characterization of the building, which was to be plain and durable,

[a] The Smithsonian Institution, 1846–1896: The History of its First Half Century, pp. 247 *et seq.*

without unnecessary ornament, and to contain provisions for cabinets of natural history and geology, and for a library, a chemical laboratory, and lecture rooms. * * * The cost was at that time limited to $80,000. In 1846, however, the bill of Dr. Robert Dale Owen, without change of phraseology from those which had preceded it in regard to location and character of the structure, was adopted, but the limit of the cost was increased, and $242,129, the exact amount of the Smithsonian interest which had at that time accrued, "together with any additional interest which might remain after paying the current expenses of the succeeding years," was designated for that purpose. * * *

From the very beginning Doctor Owen was the chief advocate of a large and showy building. In this matter he was supported by the sympathy of the people of Washington, and especially Mr. William W. Seaton, mayor of the city and one of the Regents, whose interest in the realization of the plan of Smithson undoubtedly did much at last to secure action from Congress. Outside of Washington there was much opposition to an expensive building, owing partly to the manner in which the bequest of Stephen Girard had been rendered for many years inoperative by the action of its trustees. * * * Dr. Owen, nevertheless, more than any other person at that time concerned in the establishment of the Institution, seems to have felt that much of its future success depended upon the erection of a building which should perform a legitimate duty in dignifying and making conspicuous the work of the organization to which it belonged. Scarcely anyone can doubt that Doctor Owen was right and that the usefulness of the Smithsonian Institution has been materially aided by the fact that its building has for fifty years been one of the chief architectural ornaments of the national capital.

1846 and 1847.

The first formal action of the Board of Regents, in respect to the building called for in the fundamental act, was the passage of a resolution on September 9, 1846, authorizing and instructing the Chancellor, Secretary, and executive committee—

to take such measures as may be deemed by them most proper to obtain plans for the erection of buildings, fulfilling all the conditions in reference to them contained in the law organizing this institution, and that said committee report such plan as they may approve to this Board at its next meeting; and, further, that said committee specially report in regard to the best material for said buildings, and to the best modes of warming, lighting, and ventilating the same, with estimates of the cost when constructed of different materials, etc.

The committee so organized consisted of Vice President George M. Dallas, chairman; Representatives William J. Hough and Robert Dale Owen, Gen. Joseph G. Totten, and W. W. Seaton, mayor of Washington.

A notice to architects, inviting competitive designs, was published in the Washington newspapers of September 22, 1846, and with the object of accumulating information that might guide the Board in the choice of a plan for the building, a subcommittee, consisting of Messrs. Owen, Hough, and Totten, visited the principal cities of the United States; examined many of their most noted structures; had conferences with several eminent architects; collected specimens of the best stone material, and obtained data regarding the cost of construction.

This subcommittee reported the results of their inquiries on November 30, 1846. After which the full—

committee unanimously selected out of thirteen plans that were submitted to them by some of the principal architects throughout the country, two by Mr. James Renwick, jr., of the city of New York, the architect of Grace Church, the Church of the Puritans, Calvary Church, and other structures in and near New York; and they recommended to the Board for adoption one of these, being a design in the later Norman, or, as it may, with more strict propriety, be called, the Lombard style, as it prevailed in Germany, Normandy, and in southern Europe in the twelfth century. The design comprises a center building, with two wings, connected with the main building by low ranges and a cloister. The entire front is 421 feet, and the extreme depth in the center, including the carriage porch, 153 feet. The height of the principal tower is 145 feet, and that of the main building, to the summit of the battlement, 58 feet. The design includes all the accommodations demanded by the charter, to wit: A museum, 200 feet by 50; a library, 90 feet by 50; a gallery of art, in the form of a T, 125 feet long; two lecture rooms, one of which is capable of containing from 800 to 1,000 persons, and the other is connected with the chemical laboratory; a committee room for the Board of Regents; a Secretary's room; a room for the effects of Mr. Smithson; a janitor's room, etc.

At a meeting of the Regents on January 23, 1847, the following resolution from the committee was brought up for consideration, but no action upon it was taken, namely:

That the Norman plan of a building for the Smithsonian Institution, furnished by James Renwick, jr., of New York, substantially as amended, agreeably to the suggestions of the committee, is approved and adopted by this Board.

On January 26, 1847, the chancellor submitted the following resolutions, which were read and laid upon the table:

Resolved, That in view of the vast field of knowledge, to the increase and diffusion of which the act of Congress directs the efforts and funds of the Smithsonian Institution, this Board deem it inexpedient and hazardous to appropriate to the erection of a building a larger sum than one hundred thousand dollars.

Resolved, That John Haviland, of Philadelphia, architect, be requested to state in writing, formally to this Board, whether he will undertake to erect a building upon the model of the central structure he has already planned and furnished to this Board, with slight changes of arrangement, which will embrace all the chief objects expressed in the act of Congress, for the sum of one hundred thousand dollars; said building to be of granite or sandstone.

Resolved, That the committee of three, hereinafter appointed, be authorized to confer with Mr. Haviland, and that, upon this Board receiving from him the written and formal undertaking mentioned in the foregoing resolution, they be authorized to engage his services as architect for the execution of his plan and to complete all the necessary contracts.

Mr. Alexander D. Bache, one of the Regents, submitted to the Board on January 27, 1847, two resolutions of similar import, the consideration of both of which was deferred. One of these was as follows:

Resolved, That in the opinion of the Board of Regents of the Smithsonian Institution it is unnecessary and inexpedient to expend, in erecting a building to meet the requirements of the act creating the establishment, from the principal of the fund of

two hundred and forty-two thousand one hundred and twenty-nine dollars referred to in the first section of the act, a sum exceeding one hundred thousand dollars.

The resolutions finally adopted preliminary to the work of building were agreed to by the Regents on January 28, 1847, nearly all being offered by Mr. Owen. The most important follow:

Resolved, That the Norman plan of a building for the Smithsonian Institution, furnished by James Renwick, jr., of New York, substantially as amended and reduced agreeably to the suggestions of the committee, is approved by this Board.

Resolved, That a building committee of three members of the Board, as provided in the fifth section of the act of Congress, be appointed, who are hereby authorized and empowered, on behalf of the Smithsonian Institution, to enter into contracts for the completion of the buildings; and that said committee have power to employ one or more persons to superintend the erection of the buildings and the fitting up of the rooms of the institution; and that the work shall be done to the entire satisfaction of the said superintendent or superintendents; and that the said superintendent or superintendents shall have power, and shall be required, to reject any of the material proposed to be employed, and also to object to inferior or insufficient work, and to direct its change, at his or their discretion.

Resolved, That in the performance of the duty intrusted to them, the building committee of three hereinbefore referred to shall give the contracts to the lowest bidder of good reputation, who shall give unexceptionable security, to the entire satisfaction of the committee, for the performance of said contracts; and such security shall in all cases be taken. No advance shall in any case be made; and fifteen per cent. of all payments shall be retained until the faithful performance of the work.

Resolved, That the building committee, after taking counsel with the Secretary, shall carefully revise the specifications of the plan furnished to this Board by the architect before entering into any contract; and if, after such examination, they shall be of opinion that any modifications of the said plan and specifications are necessary for the safety, durability, or better adaptation of the structure, they may incorporate these in the said specifications; but no addition to the dimensions of the building shall be made, nor any ornament of any kind added; and the said modifications shall have sole reference to the safety, durability, and adaptation of the building. And the whole amount of the contract for the said building, including the modifications above provided for, shall, under no circumstances, exceed the amount of the original estimates of the architect, to wit: the sum of two hundred and two thousand dollars, with a percentage not exceeding ten per cent. on the said sum.

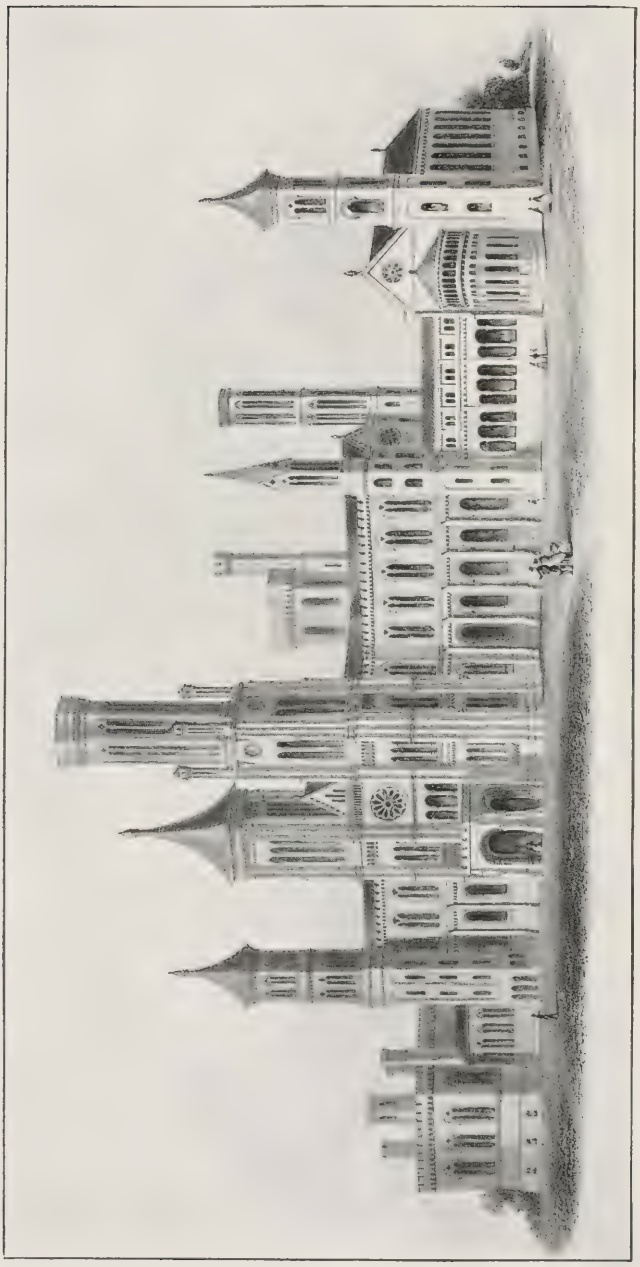
Resolved, That the building committee be also authorized to contract for the warming and lighting of the building; provided that the contract for the above objects shall not exceed five thousand dollars.

Resolved, That the building committee be also authorized to contract for the fitting up and furnishing of the building of the institution; provided that the contract for the same shall not exceed twenty thousand dollars. * * *

And it being on the one hand desirable that a portion of the buildings to be erected by the institution be ready for use at an early day, and on the other hand it is essential to the solidity and durability of a structure of the size required to embrace all the objects specified in the act of Congress that its erection be gradual and not too rapidly hastened forward: Therefore—

Resolved, That the building committee be instructed to arrange the contracts for the buildings of the institution so that the wings of said buildings may be completed in two years from the present time, and the whole completed in five years.

Resolved, That the building committee be instructed, in the arrangement of the buildings, to extend the gallery of art throughout the western range and western



THE SMITHSONIAN INSTITUTION BUILDING, VIEWED FROM THE NORTHWEST.

From a steel engraving made in 1847.

wing, and to arrange two lecture rooms, and no more, in the building. Temporary arrangements shall be made to receive in the west wing of the building the library of the Institution, until the library proper be completed.

2. *Resolved*, That the building committee invite proposals for the construction of the exterior walls of the building of upper Potomac sandstone, of marble, of granite, and of blue gneiss, respectively, and adopt that one of these four named materials which shall be deemed to combine the requisites of cheapness, beauty, and durability.

The manner of providing for the cost of building and other matters relating thereto were explained by Secretary Henry in his report for 1850, in which he says that—

The law of Congress incorporating the Institution, while it did not forbid the expenditure of a part of the income for other objects, authorized the formation of a library, a museum, and a gallery of art, and the erection of a building, on a liberal scale, for their accommodation. It was, indeed, the opinion of many that the whole income ought to be expended on these objects. The Regents did not consider themselves at liberty to disregard the indications of Congress and the opinion expressed in favor of collections, and after much discussion it was finally concluded to divide the income into two equal parts, and after deducting the general expenses, to devote one-half to the active operations set forth in the plan just described and the other to the formation of a library, a museum, and a gallery of art.

* * * It therefore became absolutely necessary that the income should be increased, and in order to do this it was proposed to save the greater part of the $242,000 of accrued interest which Congress had authorized to be expended in a building, by erecting at a cost not to exceed $50,000 the nucleus of an edifice which could be expanded as the wants of the Institution might require, and to add the remainder to the principal.

Unfortunately, however, for this proposition, Congress had presented to the Institution the great museum of the exploring expedition, and a majority of the Regents, supposing it necessary to make immediate provision for the accommodation of this gift, had taken preliminary steps, previous to my appointment, to construct a large building, and, indeed, a majority of the committee to which the matter was referred had determined to adopt the plan of the present edifice. Strenuous opposition was, however, made to this, and as a compromise it was finally agreed to draw from the United States Treasury $250,000 of accrued interest, and instead of expending this immediately in completing the plan of the proposed building to invest it in Treasury notes, then at par, and to finish the building in the course of five years, in part out of the interest of these notes, in part out of the sale of a portion of them, and also in part out of a portion of the annual interest accruing on the original bequest. It was estimated that in this way, at the end of five years, besides devoting $250,000 to the building, the annual income of the Institution would be increased from $30,000 to nearly $40,000, a sum sufficient to carry out all the provisions of the programme.

It is to be regretted that * * * instead of the plan of a costly building there had not been adopted the nucleus of a more simple edifice, which could have been modified to meet the wants which experience might indicate.

The original estimate for the building, furniture, and improvement of the grounds was $250,000, and could the actual cost have been confined to this sum all the results anticipated from the scheme of finance which had been adopted would have been realized at the end of five years. During the past year, however, it has been found necessary, for the better protection of the collections, to order the fireproofing of the interior of the edifice, at an increased expense of $44,000. This additional draft on the funds can only be met by extending the time for the completion of the building, and even this will require the appropriation of a portion of the income which

ought to be devoted to other purposes. The active operations will suffer most by this draft on the income, since it will be made for the better accommodation of the library and the museum.

On February 5, 1847, it was resolved by the Regents—

That the building committee, in conjunction with the Secretary, be authorized to publish, in such form as they may deem most appropriate, one thousand copies of a brief treatise, to be entitled "Hints on Public Architecture," and to be illustrated with designs of the plan of the building adopted for the Smithsonian Institution, and, at the option of the committee, with any other designs that are the property of the Institution, provided that the cost of the same shall not exceed one thousand dollars, which sum is hereby appropriated for that purpose.

This allotment was subsequently increased to $1,200. The work was prepared by Doctor Owen, with the assistance of Mr. Renwick, and was published in 1849, under the title "Hints on Public Architecture, containing, among other illustrations, views and plans of the Smithsonian Institution, together with an appendix relative to building materials. Prepared on behalf of the Building Committee of the Smithsonian Institution, by Robert Dale Owen, Chairman of the Committee." It is quarto in size, but does not belong to any of the regular series of Smithsonian publications.

The first building committee of three members, appointed on February 5, 1847, consisted of Mr. Robert Dale Owen, Mr. W. W. Seaton, and Gen. Joseph G. Totten. Changes were made in the composition of the committee from year to year, and after a brief period none of its early members remained. Reports were submitted annually to the Board of Regents up to the close of 1857. The work of the committee during 1847 was extremely arduous, comprising the selection of the stone for the building, the preparation of specifications, the making of contracts, etc., all of which was accomplished within an incredibly short space of time. Forty-one meetings were held during the year.

Various marble, granite, and freestone quarries within a moderate distance of Washington were examined, with the gratuitous assistance of David Dale Owen, a brother of the regent and a prominent geologist, and much information regarding them and the quality of their products was obtained. The inquiries embraced the chief marble and granite quarries of Maryland; the freestone quarries of Aquia Creek, Virginia, where the material for the older part of the Capitol, the White House, Treasury, and other public buildings in Washington had been secured; and the freestone quarries of the upper Potomac River, mostly in the vicinity of Seneca Creek, on the banks of the Chesapeake and Ohio Canal, about 23 miles above Washington.

The marble quarries of Maryland (mostly in the vicinity of Clarksville, about 13 miles from Baltimore) were found to yield two qualities of stone—one fine grained and of excellent quality, the other

somewhat coarse, highly crystalline, and inferior in quality, known as "alum limestone."

The quarries in the neighborhood of Woodstock, Maryland, furnished a granite equal to that of Quincy, and not excelled for beauty of appearance, compactness of structure, and uniformity of color, texture, and composition by any other granite quarries in the United States. There was no objection to this stone except on the score of expense, unless it be considered that in this material the effect of light and shade from projecting surfaces is in a measure lost, while in marble and good tinted freestone every shadow is sharply marked.

The Aquia Creek freestone was not to be trusted, being pervaded by dark specks of the protoxide and peroxide of iron, which, in peroxidating, acquire a yellowish or reddish color, and having occasional clay holes, such as disfigure the Treasury and Patent Office buildings.

The freestone from the upper Potomac, in the vicinity of Seneca Creek, was considered the best and most durable of all the Potomac freestones. The lilac-gray variety found in the Bull Run quarry, 23 miles from Washington, was especially recommended and pronounced to be equal, if not superior, to that supplied for Trinity Church, New York, from the quarries of New Jersey. It has a quality that specially recommends it to builders. When first quarried it is comparatively soft, working freely before the chisel and hammer; but, by exposure, it gradually indurates, and ultimately acquires a toughness and consistency that not only enables it to resist atmospheric vicissitudes, but even the most severe mechanical wear and tear. It can, therefore, be worked at less expense than granite or marble and was the kind selected for the building.

All of the above varieties of stone were subjected to tests for durability under exposure to the weather, etc., by Prof. Charles G. Page. Their cost per cubic foot, delivered in Washington, in accordance with the lowest prices quoted by quarry owners, was as follows:

	Cents.
1. Coarse-grained marble or alum limestone, according to quality	50 to 60
2. Fine-grained marble	70
3. Granite	46
4. Aquia Creek freestone	40
5. Seneca Creek freestone, lilac-gray variety, from Bull Run quarry	20

Bids for the construction of the building were received up to March 15, 1847, and were opened on March 16. Several were found to be proposals for doing only a part or some particular kind of the work, but for the erection of the entire building there were fourteen bids, varying in amount from $196,000 to $318,000. James Dixon & Co., of Washington, were the lowest bidders for Seneca freestone laid in rubble masonry, and also for ashlar finish, as follows:

Marble ashlar	$228,500
Seneca freestone ashlar	205,250

The committee decided that regularly coursed ashlar was best suited to the design and would make a more substantial piece of work than rubble. They also concluded that, with a doubt whether Seneca freestone did not assort even better with the Lombard style of architecture adopted than marble, it was inexpedient to expend $23,000 additional for the latter. The bid of James Dixon & Co. (consisting of James Dixon, of Washington, and Gilbert Cameron, of New York), at $205,250, was therefore accepted. Mr. Dixon retired from the firm on June 1, 1847.

The contract was signed on March 19, 1847. It included the most expensive part of the furniture, such as the shelving, cases, desks, drawers, and tables in the laboratory and apparatus room; the bookcases, large tables, and alcove desks in the library; the glass cases in the museum; the seats in the lecture rooms, elevators, toilet rooms, rain-water cisterns; the chairs and tables in the Regents' rooms, flues for heating and lighting, etc., but not the heating and lighting plant nor the drainage.

One condition of the contract was that the work should extend through five years, or to March 19, 1852. It was also stipulated that the building should be erected in such proportions during each year as the committee might direct, but so that the payments to the contractor in each of the first four years of the contract should not exceed $41,000 annually, and that the wings and connecting ranges should be completed in two years from the date of the contract.

It was subsequently appended to the contract that in case the Regents should thereafter determine to make important alterations in the plan of the building or in the time of its execution, the contractor was to be paid pro rata according to the prices in the contract for work executed, and reasonable damages if the nature of the case should justly demand it.

The architect, James Renwick, jr., who resided in New York and made approximately monthly visits to Washington, was paid at the rate of $1,800 a year, with traveling expenses amounting to about $300 more. An assistant architect and superintendent, Mr. Robert Mills, was also employed on the grounds, at $1,000 a year.

The probable cost of the building had been estimated as follows:

Contract for building	$231,000
Fitting up and furnishing	20,000
Warming and lighting	5,000
Superintendence ($3,000 annually)	15,000
Drainage	1,350
Supplying water to building	650
Total	273,000

Owing, however, to the contract being lower than was expected, and to other facts, the committee judged that the expenditures for the building for the five years would amount to only about $236,000.

The location of the building was fixed in the middle of the Smithsonian reservation as to north and south, the center of the main structure being upon the axis of Tenth street southwest.

Toward the close of the year 1847, as stated in the committee's report, the contractor was covering in the east connecting range, and hoped still to cover in the east wing before the frost interfered. He had also begun to lay the foundations of the west wing and connecting range, but nothing had yet been done toward the erection of the main building.

The corner stone was laid on May 1, 1847, with imposing Masonic ceremonies, the day being regarded in Washington in the nature of a public holiday. A procession over a mile in length, composed of the various lodges of Free and Accepted Masons of the District of Columbia, with a large delegation of Masons from Baltimore and Philadelphia, the District militia, and three military bands, having formed at the city hall, proceeded to the Executive Mansion, where it was joined by the President, heads of Departments, members of the diplomatic corps, etc., and thence to the Smithsonian grounds. The marshal in chief was Mr. William Beverly Randolph. After prayer by the grand chaplain of the Grand Lodge of Maryland, the ceremony of laying the stone was performed by Grand Marshal Benjamin B. French, assisted by Col. James Page and Mr. Charles Gilman, grand masters of Pennsylvania and Maryland, respectively. An address was then delivered by Hon. George M. Dallas, chancellor of the Board of Regents. A national salute was fired by the Columbia Artillery and one of the bands played a national air. The ceremonies closed with the benediction, pronounced by Rev. Frank S. Evans. The gavel used and the apron worn by the grand marshal were the same that had been used by Washington in conducting the Masonic ceremonies upon the laying of the corner stone of the national Capitol. In a cavity of the stone were deposited, in a leaden box and leaden casket, many articles appropriate to the purpose, and among them an engraved plate, inscribed with the names of the members of the establishment, the officers and Board of Regents of the Institution, the building committee, and the architects. The ceremonies were witnessed by at least 6,000 or 7,000 persons.

1848.

At the close of 1848 the building committee reported that the east wing and adjacent range would probably be ready for occupation early in January. The interior of this part was at that time finished except the shelving of the cases for the apparatus and the furnaces and ventilating apparatus. Battlements, not in the original plan, had been added to the eastern cloister, as the roof seemed too conspicuous.

The west wing and connecting range were completed externally, and the hall of the gallery of art (intended to be used temporarily for the library) was well advanced. Work upon the bookcases was in progress. The foundations of the main part of the building, including the towers, were laid, and the superstructure carried about 5 feet high. The campanile, octagonal towers, and two smaller corner towers of the center building were 30 feet above their foundations.

1849.

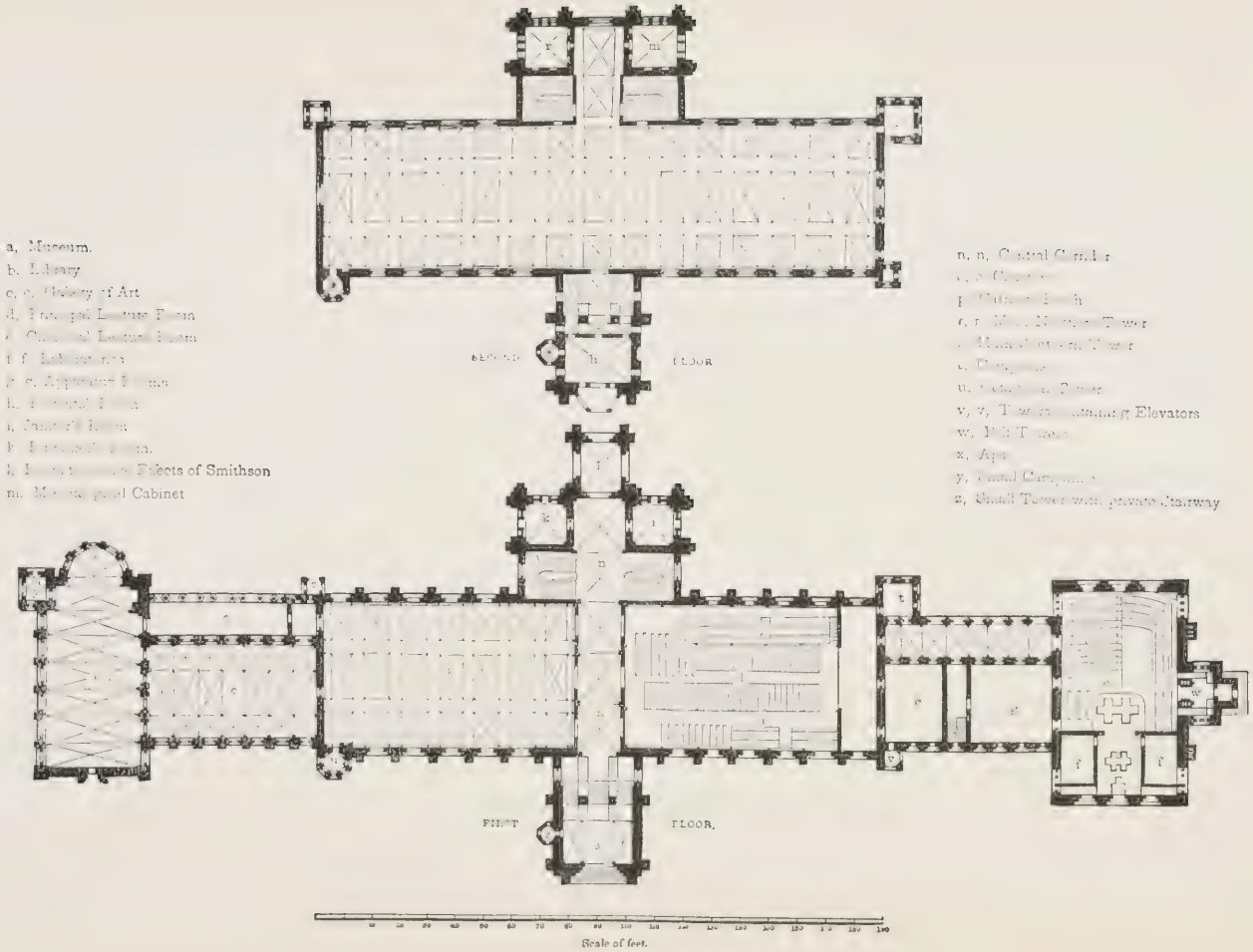
The entire Smithsonian building, according to the annual statement of the building committee for 1849, was under roof before winter, the work having been pushed to protect the large amount of masonry and woodwork. The central front towers and four corner towers of the main building were carried up as high as the walls of that building, and the central rear tower 30 feet high. The work of fitting the west wing and connecting range for temporary library purposes was still in progress. The east wing was taken possession of for the uses of the Institution April 10, 1849.

The following changes were made during the year: The lecture hall, as originally constructed, in the east wing, proving entirely too small, the adjoining apparatus and laboratory rooms were removed and the entire wing formed into one large lecture hall provided with seats for 1,000 persons. The proposed lecture room in the lower main hall was given up, and the space thus obtained was divided, a room 65 by 50 feet being assigned as a depository for physical apparatus, the remaining space being allotted to the library. The east range was to be used for the laboratory and working apparatus rooms, connecting on the one side with the lecture hall and on the other with the apparatus museum.

The two stairways, which in the original plan were carried up between the two north front towers and the main building, were dispensed with and the place they occupied added to the library, as was also the central hall, and, as before said, a portion of the proposed lecture hall. The space for the library was thereby nearly doubled in size, and the staircase was to occupy the interior of one of the front towers. A clerestory to the long upper room, or museum, of the main building was adopted by the committee, but was never constructed.

Secretary Henry's part in the above changes is thus referred to in his report for 1849:

The plan of the Smithsonian building was designed by the architect and recommended to the Board by a committee of the Regents before the programme of organization was adopted. It is not strange, therefore, when the building came to be occupied, that changes in the internal arrangement should be deemed advisable, which would better adapt it to the wants of the Institution. Such changes, at my



ORIGINAL GROUND PLANS, SMITHSONIAN INSTITUTION BUILDING.

Reproduced from Hints on Public Architecture, by Robert Dale Owen, 1849.

suggestion, have been made; and for the propriety of these I am responsible. They are principally, however, those of simplification, and in themselves add nothing to the cost of the edifice. An increased expense, however, will arise out of the furnishing of new rooms which have been acquired by the alterations.

1850.

The operations during 1850, as shown by the building committee's report, were mainly directed toward the completion of the exterior. The central building was roofed and slated, and inclosed in such manner as to be perfectly protected from the weather. The principal front tower was carried up to a height of 122 feet and covered in temporarily for the winter. The lower central tower was completed. The campanile and northeast corner towers were roofed in. The central south tower was carried to a height of 40 feet, and the southeast and southwest corner towers were built to the height of the cornice of the cell of the main building.

At this time Secretary Henry reported on the general state of the finances as follows:

After all the expenditures which have been made on the building, grounds, publications, researches, purchase of books and apparatus, not only is the original bequest untouched, but there is now on hand upward of $200,000 of accrued interest. This will be sufficient to finish the exterior of the building, including all the towers, the interior of the wings, ranges, and a part of the interior of the main edifice; which will afford sufficient accommodation for some years to come, and leave $150,000 to be added to the principal.

On February 26, 1850, a portion of the interior framing and floors of that part of the main building intended to contain the museum of apparatus, fell into the basement, and a meeting of the building committee was immediately called to examine into the conditions. This accident also led to a meeting of the Regents on March 2, at which the following resolution was adopted:

Resolved, That the building committee be requested to take under consideration the reports of the architect, superintendent, and contractor, on the subject of the late accident; that they associate with them Professor Bache, General Totten, the Secretary of the Institution, and some competent and entirely impartial architect or architects; that they make a survey of the whole building, report the manner, faithfulness, and security in which the building contract has hitherto been executed, and upon the plan most proper, in their estimation, to repair the damages and finish that portion of the building in which the accident happened and other unfinished portions thereof.

The committee so designated reported on July 3, 1850, its principal conclusions and recommendations being as follows:

1. That the workmanship of the cut stone of the exterior is good, and the masonry generally, though in some respects not of the best quality, is of a passable character with reference to the terms of the contract.

2. That the interior of the main building is defective in the kind of materials originally adopted, and to a considerable degree in the quality of the materials employed.

These consist principally of wood, and are not of a proper character for a building intended to contain valuable deposits, many of which will be donations to the institution, presented with the implied condition that they are to be properly secured against danger from fire. This mode of construction was probably adopted by the original building committee, in order to lessen the cost of the edifice and to bring it within the sum appropriated by the Board.

3. Although the committee are anxious to save the accrued interest, and to devote it to objects more in accordance with the spirit of the original bequest than the erection of a costly building; yet, they would recommend that the interior work of the center building, as now existing, be removed, and that there be substituted for it a fireproof structure, in accordance with the plan recommended in the reports of Mr. Renwick and of the commission of architects.

4. The completion of the building on this plan, according to the estimate of the commission, requires an additional outlay of about $44,000. To meet this additional expense, the committee recommend the adoption of the suggestion of their chairman, Colonel Davis, that the exterior of the building and the interior of the towers be completed in accordance with the plan and within the time specified by the contract, and that the remainder of the interior be finished agreeably to the new plan, in the course of a number of years, and in such portions as can be paid for out of the annual interest of the Smithsonian fund, not otherwise appropriated. The object of this part of the proposition is to prevent the derangement of the plan of finance originally proposed by Doctor Bache and adopted by the Board of Regents, viz, of saving out of the accrued and accruing interest, after paying for the building, the sum of $150,000, to be added to the principal.

5. By the addendum to the contract, the Regents have the power of stopping the building at any stage of its progress on paying the contractor pro rata for the work done, according to the prices specified in the contract, and allowing for reasonable damages if the circumstances require the payment of them. The estimates in this case are to be made by the architect of the institution or other architects selected by the Regents. But with reference to the quality of the work which has been done, it is the opinion of the legal adviser of the committee that the decision of the architect of the building is final, both with regard to the Regents and the contractor.

6. In accordance with the forementioned stipulations of the contract, the committee have requested Mr. Renwick to furnish an estimate pro rata for completing the whole exterior of the building and the interior of the towers, making deductions for materials and workmanship which he would have condemned had the building been completed according to the original plan. The following is the decision of the architect, which has been agreed to by the contractor, with the understanding that nothing is to be paid him on account of profit on work omitted by the proposed change, viz:

For finishing the whole exterior of the building, all the interior rooms of the towers and of the wings, the sum of..... $185,154

7. The committee recommend to the Board of Regents that they agree to this proposition, and that a resolution be adopted directing the contractor to proceed with the work in accordance therewith. In recommending this course to the Board, the committee act in conformity with the advice of two of the commission of architects, viz: Mr. E. B. White and Mr. J. R. Niernsee, who undertook the examination in detail of the parts of the building, and gave an estimate as the basis of an equitable settlement.

8. By adopting the above sum of $185,154 as the amount to be paid to the contractor, Mr. Renwick gives the following estimate of the cost of finishing the building in accordance with the fireproof plan, viz:

Amount of proposed contract		$185,154
Expense of fireproofing the entire center building according to plans and estimates of the architects		44,000
Expenses common to both plans:		
Plastering center building	$8,000	
Gallery fronts	2,000	
Staircase of library and Museum	425	
Furniture of library and Museum	4,700	
		15,125
Extra cartage		200
Materials now on the ground, but which may not be used		1,000
Total expense of the building, including fireproofing		245,479

9. The original contract, with the addition made to it by direction of the building committee, is	209,810
Add the estimate of fireproofing	44,000
Thus we have for the cost of the building, according to the estimate of the commission	253,810

NOTE.—The foregoing estimates are exclusive of the salaries of the architect and superintendent; also of the cost of the improvement of the grounds and part of the furniture.

This last sum is greater than the preceding by $8,331. The difference, according to the statement of Mr. Renwick, is due to the various deductions he has made on account of defective materials, imperfect workmanship, and changes in the plan.

In conclusion, the committee are fully of opinion—and in this they are sustained by the commission of architects—that, by adopting the plan of fire-proofing proposed by Mr. Renwick and the proposition of the contractor, the building will be rendered safe and durable at a very reasonable cost, considering the amount of work which has been bestowed upon it.

The committee do not consider it necessary to offer any remarks on the cause of the accident which led to these investigations. If these recommendations be adopted, the whole structure of the interior of the main building in which the accident occurred will be exchanged for one more in accordance with the permanence and utility of the edifice, and in this case they will consider the accident as a fortunate event.

1851.

In view of the report of the special committee following the accident in 1850, the Regents found it necessary to deviate from their original intention, and to order the removal of the woodwork which had been erected in the interior of the main building and direct that its place be supplied by fireproof materials. During 1851 all the exterior of the building, including the towers, was completed. Some minor changes in interior construction, insuring better fireproofing, was also arranged for.

At a meeting of the Regents on February 27, 1851, it was resolved that the executive committee be requested to inquire into the feasibility of providing buildings for the residences of the officers of the

Institution on the Smithsonian grounds or other convenient location, and, if they deem expedient, to report plans and estimates for such buildings to the Board at their next meeting. The reply of the executive committee, made on May 1, 1852, was as follows:

That after due reflection they have come to the conclusion that it would conduce very much to the interests of the Institution if the officers were provided with houses on the Smithsonian grounds, so that they might be present on all occasions and be as much as possible at all times identified with the operations of the Institution; yet at present, while the main edifice is unfinished, they do not consider it advisable to incur the expense of additional buildings, and would therefore recommend that in lieu of the rent of a house $500 be added to the salaries of Professors Jewett and Baird, to be paid from the beginning of the present year.

1852.

In this year the contract with Gilbert Cameron, including the finishing of the exterior of the entire building and the interior of the wings, connecting ranges, and towers, was declared completed, leaving the whole interior of the main building to be finished. All the woodwork and plastering of the interior of the main building was, by resolution of the Board, to be removed and its place supplied by fireproof materials. Mr. Renwick withdrew his services, as it was not thought best to continue his salary, and Capt. B. S. Alexander, U. S. Corps of Engineers, was employed to prepare detailed drawings and plans for the balance of the work.

Referring to this subject in his report for 1852, Secretary Henry wrote:

From the report of the building committee it appears that the contract for finishing the interior of the wings and ranges and the rooms of the towers has been completed. The whole interior of the main building, comprising a rectangular space of 200 feet long, 50 wide, and about 60 high, remains to be finished with fireproof materials. It is proposed to divide this space into two stories and a basement. These stories will be devoted to the library, the museum, and a large and convenient lecture room.

The business of the Institution would be much facilitated were this part of the building completed. Since Congress has authorized the establishment of a library and museum, it will be well to place all the objects of interest to the public in the main building and make this exclusively the show part of the establishment, devoting the wings and ranges and rooms of the towers to the business operations and other purposes of the Institution. In the present condition of affairs there is no part of the edifice to which the public has not access, and, consequently, business has to be transacted amidst constant interruptions. The loss of time and effective life to which all are exposed who occupy a position of notoriety in the city of Washington is truly lamentable, and where this is enhanced by facility of access to gratify mere curiosity the evil becomes scarcely endurable. Progress in business under such circumstances can only be made by an encroachment on the hours usually allotted to rest, and that, too, at the expense of wasted energies and shortened days.

1853.

Mr. Gilbert Cameron was given the contract for completing the structure in accordance with his previous terms, and the building committee kept constantly in view the idea of rendering the main building entirely fireproof and of constructing it in the most durable and substantial manner. These changes of arrangements delayed work until June 13, 1853, from which time onward it was actively prosecuted. The committee found great difficulty in deciding upon a proper position and plan of a large lecture room, but finally concluded to place it in the second story in the middle of the main building, where the greatest width could be obtained.

1854.

At the close of 1854 the building committee reported that the main or center building was finished, with the exception of a few unimportant additions. Many changes had been required for the better security and adaptation of the building, and they involved an additional expense.

1855.

During this year the entire edifice was completed, and the final report of the architect was approved by the committee. The following account of the interior of the building at this time is taken from Secretary Henry's report for 1855, with some annotations from the report of the building committee:

The building is at length completed, and its several apartments are now in a condition to be applied to the uses of the Institution. As various changes have been made in the original plan, the following brief description may not be inappropriate at this time. It consists of a main edifice, two wings, two connecting ranges, four large projecting towers, and several smaller ones. Its extreme length from east to west is 447 feet, with a breadth varying from 49 feet to 160 feet. The interior of the east wing is separated into two stories, the upper of which is divided into a suite of rooms for the accommodation of the family of the Secretary. The lower story principally comprises a large single room,[a] at present appropriated to the storage of publications and the reception and distribution of books connected with the system of exchange. The upper story of the eastern connecting range is divided into a number of small apartments devoted to the operations in natural history, and the lower story is fitted up as a working laboratory.

The interior of the main edifice is 200 feet long by 50 feet wide[b] and consists of two stories and a basement. The upper story is divided into a lecture room capable of holding 2,000 persons[c] and into two additional rooms, one on either side, each 50

[a] Seventy-five feet by 45 feet.

[b] And 60 feet high from the basement floor to the upper ceiling.

[c] The lecture room, the optical and acoustic properties of which are probably unsurpassed by any apartment intended for the same purpose in the United States, occupies one-half of the upper story of the main building, besides a portion of the front and rear towers. Its precise length is 96 feet and extreme width 62 feet. It will comfortably seat 1,500 persons, and when crowded will contain upward of 2,000.

feet square, one of which is appropriated to a museum of apparatus and the other, at present, to a gallery of art. Both are occasionally used as minor lecture rooms and for the meetings of scientific, educational, or industrial associations.

The lower story of the main building consists of one large hall, to be appropriated to a museum or a library. It is at present unoccupied, but will be brought into use as soon as the means are provided for furnishing it with proper cases for containing the objects to which it may be appropriated.[a]

The basement of this portion of the building is used as a lumber room and as a receptacle for fuel.

The west wing is at present occupied as a library, and is sufficiently large to accommodate all the books which will probably be received during the next ten years. The west connecting range is appropriated to a reading room.

The principal towers are divided into stories, and thus furnish a large number of rooms of different sizes, which will all come into use in the varied operations of the Institution. A large room in the main south tower is appropriated to the meetings of the "Establishment" and the Board of Regents; three rooms in one range, in the main front towers, are used as offices; and two rooms below, in the same towers, are occupied by one of the assistants and the janitor; other rooms in the towers are used for drawing, engraving, and workshops. There are in the whole building, of all sizes, 90 different apartments; of these 8 are of a large size, and are intended for public exhibitions.

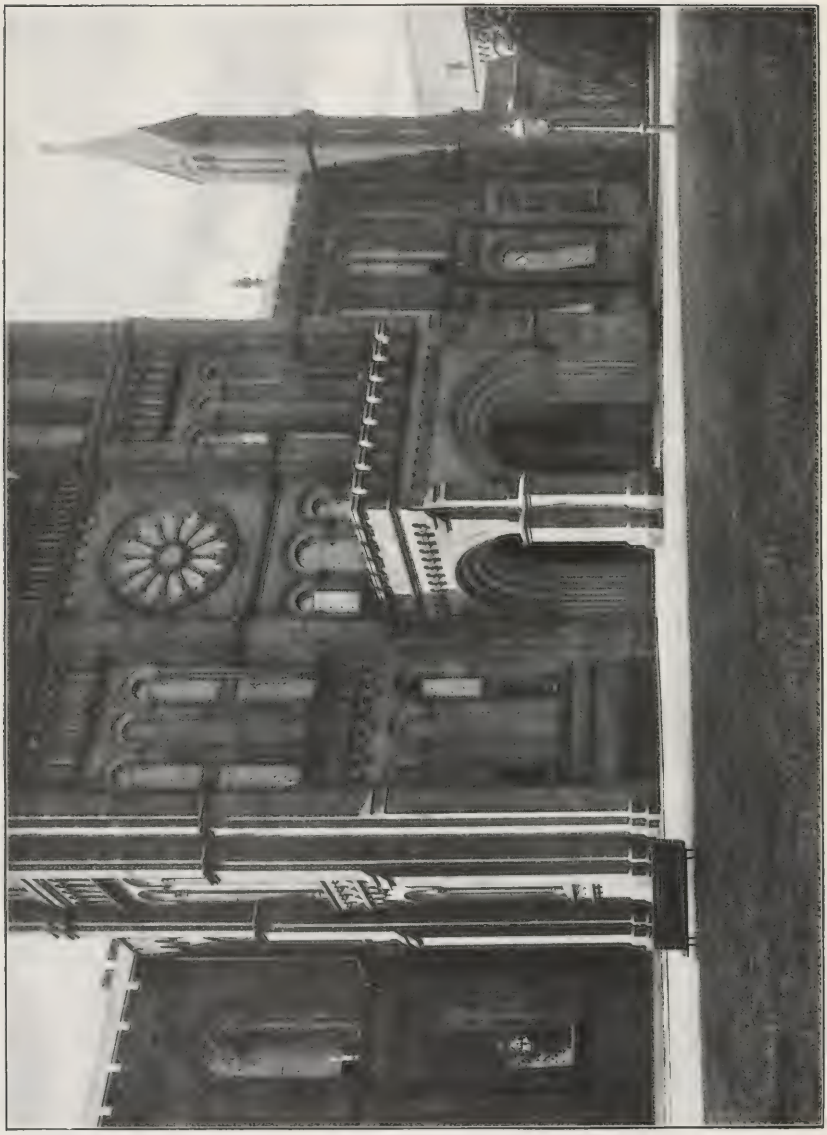
The delay in finishing the building has not only been attended with advantage in husbanding the funds, but also in allowing a more complete adaptation of the interior to the purposes of the Institution. It is surely better, in the construction of such an edifice, to imitate the example of the mollusk, who, in fashioning his shell, adapts it to the form and dimensions of his body, rather than that of another animal who forces himself into a house intended for a different occupant. The first point to be settled in commencing a building is the uses to which it is to be applied. This, however, could not be definitely ascertained at the beginning of the Institution, and hence the next wisest step to that of not commencing to build immediately was to defer the completion of the structure until the plan of operations and the wants of the establishment were more precisely known.

* * * The whole amount expended on the building, grounds, and objects connected with them is $318,727.01. This exceeds considerably the original estimate and the limit which was at first adopted by the Regents.

The excess has been principally occasioned by substituting fire-proof materials for the interior of the main building instead of wood and plaster, which were originally intended.

* * * We should not forget that the ordinary expenses of the Institution have constantly increased, and that, while the nominal income has remained the same, the value of money has depreciated; and, consequently, the capability of the original

[a] The ceiling is supported by two rows of columns extending the whole length. At the middle of the space corresponding to the principal entrances are two wing walls, by which, with the addition of screens, the whole space may be divided into two large rooms, with a hall extending across the building between them. This story may be used for a library or a museum, or for both, as the wants of the Institution may require. It is finished in a simple but chaste style and has received general commendation. Indeed, it is, perhaps, in appearance one of the most imposing rooms in this country, apart from adaptation to its purposes. The floor through the middle part is formed of cut stone, that of the other parts is of wood, which, resting on the arches beneath, without space between to contain air, is considered sufficiently fireproof and not subject to dampness from the variation of temperature and humidity of the atmosphere.



MAIN OR NORTH ENTRANCE OF THE SMITHSONIAN INSTITUTION BUILDING.

bequest to produce results has been abridged in a corresponding proportion. Besides, when the building is entirely occupied, the expense of warming, attendance, etc., must necessarily be much increased beyond its present amount. The repairs, on account of the peculiar style of architecture adopted, will ever be a heavy item of expenditure. The several pinnacles, buttresses, and intersecting roofs all afford points of peculiar exposure to the injuries of the weather.

1857.

In 1857 the building committee stated that at its last session Congress had appropriated $15,000 for cases for the collections belonging to the Government. These were then finished and formed a beautiful addition to the large hall on the first floor, being apparently well adapted to the purpose intended. The west wing, devoted to the library, had been furnished with alcoves and a gallery extending around three sides of the room, an arrangement serving to increase greatly the accommodation and security of the books.

No report was made by the building committee after this year.

1858.

In his report for 1858 Secretary Henry states that—

In order to increase the capacity of the large room appropriated to the collection, the cases have been arranged in two stories, forming a series of alcoves and a gallery on each side. By the adoption of this plan space can be provided for double the number of specimens which were exhibited at the Patent Office.

* * * * * * *

Comparatively few repairs have been required during the past year on the building, though the changes which have been necessary to accommodate the increasing operations of the Institution have involved considerable expense. The corridors, which were entirely open to the northwest wind, have been inclosed with glazed sashes; a large amount of space has thus been rendered available, and a considerable portion of the interior of the building protected from the inclemency of the weather.

During this year the Government collections at the Patent Office were transferred to the lower main hall of the Smithsonian building, in accordance with the provisions of the act of Congress of August 10, 1846.

FIRE OF 1865, AND RESTORATION OF THE BUILDING.

On January 24, 1865, the building of the Smithsonian Institution was visited by a destructive fire, which burned out the upper story of the main building and the large towers at the north and south entrances. The following account of this disaster is taken from Secretary Henry's report for 1865:

The most important event of 1865 was the destruction of a part of the building and its contents by the fire of January 24. This event must continue to form an epoch in the history of the Institution; and though it can not but be considered a most serious disaster, it may yet lead to changes of importance in the correction of tendencies which might ultimately have absorbed the annual income and neutralized the more liberal policy which has thus far been pursued. In view, therefore, of the character of the event, as well as the continuity of the history, it is deemed expe-

dient, before proceeding with an account of the operations of the year, to repeat briefly the facts connected with the origin and results of the fire.

It may be well, however, for the better information of those not acquainted with the Smithsonian building, to premise in regard to it the following particulars: It consists of a main edifice 200 feet long and 50 wide, with two large wings and two connecting ranges, having in all an extreme length, in an east and west direction, of 450 feet. In front and rear of the middle portion are projections, terminated by high towers, two on the north and one on the south side; moreover, on each corner of the middle building is a smaller tower, and also one on each of the two wings.

The whole of the first story of the main building, in a single room, is devoted to the museum; the upper story, in three apartments, was assigned to the lecture room, the gallery of art, and the cabinet of apparatus. The west wing is entirely appropriated to the library; the east wing to the residence of the Secretary and a storeroom for publications and specimens of natural history. The east connecting range contains the laboratory and office rooms; the west range is an extension of the museum. In the large towers were the Regents' room, the offices of the Secretary, storerooms, and workshop.

Though the original plan was much admired for its architectural effect, it was soon found that, in relation to the means at the disposal of the building committee, it was too expensive to admit in its construction of the exclusive use of fire-proof materials; hence, while the exterior was to be constructed of cut freestone, it was concluded to finish the interior in wood and stucco. Fortunately, this plan, which was carried out in regard to the wings, the connecting ranges, and the towers, was abandoned before the completion of the main building. After the exterior of this, including the roof, had been finished and the framing of the interior was in place, the latter suddenly gave way and was precipitated into the cellar—a mass of broken timber. The attention of the Regents having been called by this accident to the insecurity of the woodwork, they directed that the further progress of the building should be stopped until means could be accumulated for finishing the remainder of the edifice in a more stable manner and with fire-proof materials. In accordance with this direction, after an interval of several years, the construction was recommenced under the direction of Capt. (now Gen.) B. S. Alexander, of the Engineer Corps, and the whole of the main building, except the inside of the towers and the framing of the roof, which had previously been completed, was finished in a substantial manner in iron and brick work. The architect advised the removal of the roof, but as this would have swelled the cost of the building still further beyond the estimate and the means at command, and as the covering was of slate, the framing under it was thought to be in no danger from fire. This, however, was destined to be the part on which the first attack of the element was to be made. Through a mistake in some workmen, the pipe of a stove which had been temporarily used in one of the upper rooms was introduced through the wall into a furring space resembling a flue, but which discharged the heated air from the combustion into the loft immediately under the roof, instead of into the air through the true chimney.[a]

[a] Previous to the fire the large room partly occupied by the Stanley collection of Indian portraits had been fitted out with about 200 feet of cases around the walls to receive the ethnological specimens in the possession of the Institution. While engaged in rearranging the pictures above these cases, the workmen, with a view to their own comfort, unfortunately placed the pipe of a stove in a ventilating flue which opened under the roof, and thus caused the conflagration which destroyed the upper part of the main building. Fortunately, none of the ethnological articles had been placed in this room, and consequently these specimens, with those of the museum and of the general collections, have been preserved. (Secretary Henry. Report for 1864, p. 31.)

The rafters were set on fire, and before the burning was discovered the entire woodwork under the covering was in flames. The progress of the fire was so rapid that but few of the contents of the upper rooms could be removed before the roof fell in. The flames soon extended to the large towers, and, as these acted as high chimneys, they greatly increased the intensity of the combustion. The conflagration was only stayed by the incombustible materials of the main building. Had the original plan of constructing the interior of the edifice in wood and plaster been fully carried out, the whole structure would have been destroyed and the valuable library and rich collections of specimens of natural history entirely lost.

The aperture which deceived the workmen was probably made by those who originally plastered the building. It occupied a middle point between two windows, and from its position would naturally lead to the inference that it was designed to conduct the products of combustion directly into the chimney, from which it was only separated by the thickness of a single brick. For what reason it had not been placed in the middle between the two windows is unknown. It is remembered that some ten years previous to the fire this opening was during several weeks used for the insertion of a stove pipe, without suspicion of accident at the time; but in the interval the wood had undergone a process of drying which rendered it more combustible.

Constantly impressed with the fact that the interior of the two wings and the connecting ranges were constructed of combustible material, I have always felt great anxiety on account of the liability to conflagration of these parts of the building. The rest of the edifice, with the exception of the interior of the towers, was supposed to be secure from injury of this nature. A night watch was constantly kept, barrels and buckets filled with water were placed at suitable points, and strict rules were adopted prohibiting the carrying of exposed lights, as well as the practice of smoking, in any part of the edifice. That these precautions were unavailing has been seen, the fire having been communicated at a point where danger was least suspected, and in a manner which rendered its occurrence sooner or later almost inevitable.

The weather at the time was extremely cold, and before the engines could be brought into operation the whole of the roof was in flames. Commencing at the west end of the center building, the flames were driven by the wind, which blew from that direction eastwardly, and, fortunately, away from the library, in the west wing. The destruction of the roof of the main building involved that of the contents of the rooms immediately beneath it and also those of the three principal towers adjacent. In the former were the Indian portrait gallery, the lecture room, and the apparatus room. The first of these contained the large collection of paintings by Mr. Stanley and a series of Indian portraits belonging to the Government. The lecture room was constructed on acoustic and optical principles, and not only answered perfectly the ends for which it was immediately intended, but had served also as a model for lecture rooms in various parts of the country. The apparatus room contained the principal part of the articles presented by the late Dr. Robert Hare, and a large number of instruments of recent construction intended both for illustration and original research.

The losses in the south tower were, first, the contents of the Regents' room, including the personal effects of Smithson; second, those of a large room above it, in which were stored the private library of Reverend Doctor Johns, of Virginia, and the public library of Beaufort, South Carolina, deposited there at the request of Hon. Mr. Stanton, for preservation until the end of the war; and, third, in the attic, a large collection of public documents and complete sets of the Smithsonian Reports, intended for distribution. The effects of Smithson had but little intrinsic value, and were chiefly prized as mementos of the founder of the Institution. They consisted of a number of articles of chemical and physical apparatus, such as were used by him in

his perambulatory excursions, two small cabinets of minute specimens of minerals, a silver-plated dinner service, and a trunk filled with manuscripts. The portrait of Smithson while a student at Oxford, a medallion likeness of him in bronze, his library, consisting of 150 volumes, and a small painting were saved. The manuscripts consisted principally of notes on scraps of paper, intended apparently for alphabetical arrangement in a commonplace book, after the manner of a philosophical dictionary.

The losses in the north towers were the contents of the offices of the Secretary, including the records and copies of the correspondence of the Institution, the woodcuts to illustrate the publications, the steel plates of an expensive memoir, several boxes of stereotype plates, a large number of manuscripts of the Secretary on scientific subjects, four memoirs accepted for publication, about a hundred volumes of valuable books from the library, used for constant and immediate reference; a large number of copies of the Smithsonian Reports and duplicate documents; the contents of the workshop, consisting of a lathe, forge, a full set of tools, and an assortment of hardware and materials for the construction and repair of apparatus; and of the upper room of the highest tower, including the clockwork of an anemometer for recording the direction and force of the wind. Not only was this instrument itself lost, but all the records which had been obtained by the use of it for the last seven years. Fortunately, nearly all the other meteorological records, which were in a lower room, were saved.

The Indian portraits, as far as they were the likenesses of particular individuals, in most cases can never be reproduced, but we are gratified to learn that the extensive collection of Mr. Catlin of a similar character has been purchased in Europe by Mr. Harrison, of Philadelphia, and will be rendered accessible to the student of ethnology. Besides this, there are in existence, particularly in Canada, other portraits sufficient in number and variety fully to illustrate the characteristics of the race. At the same time the loss has fallen very heavily upon Mr. Stanley, the painter and owner of this collection. It was the result of the labor of many years among the Indians; it constituted the pride, as it has been the crowning effort, of his life, and he ardently desired that it might be transmitted to posterity as a monument of his enterprise and industry. The hope is entertained that the Government will see fit to give him an order to paint a picture for the Capitol, in which the principal figures of this collection and the characteristics of the Indian race may be portrayed.

The apparatus presented by Doctor Hare was interesting on account of its association with the history of the advance of science in this country. The collection contained most of the articles invented by the donor, and which are described in the scientific journals of the first half of the present century. Among the chemical implements were those used by that distinguished chemist in procuring for the first time, without the aid of galvanism, calcium, the metallic basis of lime. A number of the articles of apparatus presented by Doctor Hare, though injured by the fire, may be repaired, and I have taken measures for their restoration.

Among the articles of historic interest which were lost is the lens used by Priestley for the evolution of oxygen from the oxide of mercury, and by means of which the first distinct recognition of this elementary substance was effected. It had been presented to the Institution by the nephew of the celebrated philosopher, as was also the apparatus employed by Priestley in his experiments on bodies in condensed atmospheres. The latter was but slightly injured and can readily be repaired. The other articles of apparatus may be replaced at an expense of about $10,000.

The most irreparable loss was that of the records, consisting of the official, scientific, and miscellaneous correspondence, embracing 35,000 pages of copied letters which had been sent, at least 30,000 of which were the composition of the Secretary, and 50,000 pages of letters received by the Institution; the receipts for publications and specimens; reports on various subjects which have been referred to the Institution; the records of experiments instituted by the Secretary for the Government;

four manuscripts of original investigations which had been adopted by the Institution for publication; a large number of papers and scientific notes of the Secretary; a series of diaries and memorandum and account books. Fortunately, however, a detailed history of the general operations of the Institution is preserved in the printed reports, and a large amount of correspondence connected with natural history and meteorology was saved.

Since the occurrence of the fire all the operations have been carried on in the lower story of the east wing of the building (the upper part still continuing to be the residence of the Secretary) and in the several rooms of the adjoining east range. Connected with an office in the latter, the lower story of the tower attached to the southeast corner of the main building has been converted into a fireproof vault, in which all the valuable papers and records are constantly kept, except for the usually short time they are required for consultation. To insure the wakefulness and fidelity of the watchmen we have introduced the use of an instrument called a "detector," which records the number and the times of his visits to the several parts of the building. For this instrument, which has rendered good service during the past year, we are indebted to the liberality of its inventor, Mr. J. E. Bauerk, of Boston, who, in consideration of the loss which the Institution has sustained by fire, kindly presented it free of charge.

A circumstantial account is given by the building committee of what has been done toward the reconstruction of the edifice. From this it will be seen that the plan adopted contemplates not merely the repair of the damage by the fire, but the restoration of the several parts in fireproof materials, and with such alterations in the division of the interior space as will better adapt it to the uses of the Institution.

The plans have been prepared and the work superintended by Mr. Adolph Cluss, an architect who was warmly recommended by the mayor of Washington as having been successful in designing and erecting the public schoolhouses of the city, as well as a number of churches and other buildings. These plans have been critically examined and, in some cases, modified by the chairman of the building committee, General Delafield, who, by his knowledge and experience in the line of engineering, has rendered the Institution valuable service.

No appropriation has yet been made by Congress to aid in the restoration of the building. Considering, however, the large amount of Government property intrusted to the care of the Institution, it can scarcely be doubted that in a normal condition of the national finances, an appropriation for such purpose would have been readily granted.

In consideration of the extraordinary outlay required for the reconstruction of the building, an effort has been made to reduce as much as possible the miscellaneous expenses, and to engage in no enterprise that is not absolutely necessary to the continuance of the general operations. So many articles, however, of furniture and stores of hardware and stationery were to be replaced that we have not been able to reduce the expenditures to as low a point as we could wish; yet it will be seen that they fall somewhat below those of the preceding year. * * *

The cost of the restoration of the building in fireproof materials without changing the external appearance has, as formerly stated, been far greater than was anticipated. Whether the portion of the work yet to be executed will much exceed in cost that which has already been completed will depend upon the price of materials and of labor. The Institution may in time be able to finish this work without encroaching on its present capital, provided the Secretary of the Treasury shall recognize the inadequacy of the payments of interest which for three years were made in the depreciated currency of the time. If this allowance be not made and no assistance be received from Congress, then, in order to secure the building and its contents from injury by the weather the Institution will be obliged to sacrifice a

portion of its extra fund, and to the extent of this forever diminish its power to "increase and diffuse knowledge among men."

* * * As the public museum of the Institution occupied the portion of the building constructed of fireproof materials, it escaped destruction by the fire, yet the smoke and water to which they were exposed caused some damage to the specimens, and much labor and expense were requisite to restore them to their proper appearance.

The report of Secretary Henry immediately following the fire contains some important statements, which, though made before those above quoted, can better supplement them. They are partly as follows:

Although greatly to be regretted on account of the losses incurred, the accident is not without compensation in considerations of a different nature; thus it has served to call forth the expression of a large amount of kind feeling in regard to the Institution and to direct the attention of Congress to the character and importance of its operations.

* * * Two grave errors were committed in the adoption of the present one [building]; first, the plan was but little adapted to the uses to which the edifice was to be applied; second, the style of architecture required a far greater expenditure than the amount to which the cost of the building was limited. For the purpose of architectural effect the interior was very inconveniently divided. The buttresses, turrets, and towers, while they add very little to the accommodation of the building, greatly increased the cost. To have constructed the building in a substantial and durable manner in strict conformity with the Lombard style of architecture, which was adopted, would have required an expenditure of at least double the amount of the sum appropriated for the purpose. It was therefore necessary, in order that the exterior might be constructed of freestone, that the interior should be finished in wood and stucco, and that thus recourse should be had to the presentation of a falsehood to the eye in the very inauguration of an enterprise for the advancement of truth. The two wings and the two connecting ranges were completed in this manner. The main building, which is 200 feet long and 50 feet wide, embellished with six towers, was also in process of completion, the framing of the interior having been finished, when the underpinning gave way and the whole of the woodwork fell to the ground.

After the occurrence of this accident a commission of architects appointed to examine the building reported that the exterior walls were well built, both in regard to construction and materials, but that the plan of finishing the interior in wood and stucco was improper for an edifice intended to contain valuable articles. It was therefore recommended that fireproof materials should be employed for the portions of the work which remained to be constructed. In conformity with this recommendation the interior of the main building was completed in iron, stone, and brick, with the exception of the roof, which, being covered with slate and not supposed to be exposed to danger from fire, was suffered to remain. It was this change in the mode of constructing a portion of the edifice which, during the late fire, saved the contents of the whole from destruction. It however increased the cost of the building to upward of $300,000, leaving the remaining parts of the interior of the structure in perishable materials.

* * * Nothing definite can be said at present as to the financial arrangements for the repair of the building. The subject is still before Congress, and although the idea has been confidently entertained that an appropriation would be made for the purpose, yet, from the discussion which took place in the meeting of the joint committee of the two Houses appointed to consider this matter, I do not think a resolution authorizing such an appropriation will be adopted.

The first meeting of the Regents after the fire was held on January 28, 1865, having been called principally in consequence of that event. The Secretary presented a brief account of the fire, and of the steps immediately taken, through the Secretary of War, to place a temporary roof over the main building. This work was done under the Quartermaster's Department of the Army, which furnished the necessary materials and men, the expense being subsequently refunded by the Institution. This roof was adequate to protect the building from storms without interfering with the construction of a permanent covering.

It was announced that the committees on Public Buildings and Grounds of both the Senate and House had already been directed to inquire into the origin of the fire, the approximate loss to the Government and to private persons, the means necessary to preserve the remaining portions, etc. In anticipation of the work of these committees it was thought advisable that a special committee be appointed to report directly to the Board. Mr. R. Wallach, a Regent, and Professor Henry, the Secretary, being designated as such committee, under the following resolution:

That a committee be appointed to inquire into the origin of the fire, to ascertain the extent and character of the loss sustained, and to make suggestions as to what measures should be adopted for the repair and improvement of the building.

The report of this committee, submitted at a Board meeting on February 2, 1865, after reciting the origin of the fire and explaining the losses sustained (amounting, besides the damage to the building, to about $20,000 for the Institution and $26,000 for individuals), as well as the parts saved from injury, all of which have been sufficiently described above, made the following suggestions as to what they considered should be done.

There can be no hesitation in adopting the conclusion that steps should be immediately taken not only to repair the injury, but to improve the condition of the building.

1. The main edifice should be provided with a metallic roof.

2. For the wooden conical terminations of the towers should be substituted metallic coverings.

3. All valuable articles belonging to the Institution or deposited in it, including the library, should be placed in the main building, which should be cut off from the wings by iron doors.

4. Provision should be made for a thorough heating of the whole building by steam or hot water.

5. Suggestions should be requested from competent architects and engineers as to work to be done, and those which are adopted should be embodied in working plans and drawings.

6. A building committee of the Board should be appointed to have charge of the work.

No very exact estimate can as yet be made as to the cost of the repairs, etc., for it has not been possible, without erecting a scaffolding, to determine whether it will be

necessary to take down the high northern tower. Colonel Alexander, of the Engineer Corps, however, has informed the committee that he thinks $100,000 will be required to make the necessary repairs and improvements.

The committee can not conclude without adding that, in their opinion, the occurrence of the fire ought not to be allowed to interfere with the active operations of the Institution, on which essentially depends the reputation it has established throughout the world and its efficiency as an instrument for "the increase and diffusion of knowledge among men." To the support and extension of these operations, therefore, the annual interest from the original fund should, as far as possible, continue as heretofore to be conscientiously applied.

At the same meeting measures were discussed for the repair and improvement of the building, and the opinion was expressed by the Congressional Regents present that an appropriation for the purpose would be made by Congress without opposition, but such relief was not obtained.

The joint committee of the Senate and House of Representatives, above referred to, made its report to Congress on February 21, 1865, after visiting the building, having adopted the report of the Smithsonian committee. At a subsequent meeting of the joint Congressional committee Secretary Henry was requested to describe his connection with the Institution, to give an account of its objects and operations, the origin of the building, and such other facts as might be of public interest. Secretary Henry's statement, together with the report of the committees and of the testimony, were printed conjointly as Senate Report No. 129, Thirty-eighth Congress, second session, February, 1865.

At a meeting held on March 1, 1865, it was resolved by the Regents: "That the whole subject of the repairs and reconstruction of the building * * * be intrusted to the Chancellor, the Secretary, and the executive committee." This committee reported annually during the three years from 1866 to 1868, inclusive, and the following extracts are from that source:

1865. The first step toward the reconstruction of the building was to secure the services of a competent person as architect and engineer to prepare plans and superintend the work. For this purpose Mr. Adolph Cluss, who had designed and directed the building of the principal schoolhouses of the city, was employed.

The next thing to be done was the making of a critical survey to ascertain the actual state of the walls, and to determine what parts it was necessary first to rebuild. This survey forced upon the committee the conviction that the original construction of the building, as a whole, was very defective, and, in many respects, unsuited as a receptacle of records and other valuable articles, the loss of which could never be repaired. The exterior of all the walls consists of a facing of red sandstone, bound to an irregular backing of bluestone of very bad workmanship. In the main building and in the lower portion of the large south tower was inserted a 4-inch brick lining separated by an air space from the main walls. This lining is not bound to the walls, and, therefore, does not add to their strength. It is merely a furring, intended to prevent dampness by the condensation of moisture from the atmosphere. This furring is open at the top, and it was into this that the stovepipe was inserted

which led to the accident by fire. In all the other rooms of the towers the plastering was upon the rough rubble work.

The heavy projecting cornice of the south tower was merely set in place without fastening, and, consequently, could not withstand any disturbing action.

The parts of the building which were not injured by fire, namely, the two wings and connecting ranges, as far as the committee have had the opportunity of examining, are defective in materials and construction. The floors, in some cases, though covered with flagging and filled in with deafening, rest upon beams of pine wood, which is decayed, and in the course of a few years the interior of these parts will require renewal.

It is proper to state that the foregoing remarks on the character of the materials and the construction of the building are not applicable to the work on the main edifice, subsequently executed under the superintendence of Capt. (now General) B. S. Alexander, of the United States Engineers. This work, which principally consisted in the arching of the basement and the main story of the upper building, was executed in fireproof materials and prevented the extension of the fire, and, consequently, the destruction of the entire edifice and all its contents.

From the foregoing account of the original construction of the building, it will not be surprising that the effect of the fire was found to be much more serious than previous to this survey it had been supposed, and that the work to be done could not be confined to the mere repairing of the injury caused by the fire, but would include also the rebuilding of a considerable part of the edifice; and this was particularly the case on account of the decision of the Board that the restoration should be in all parts indestructible by fire.

The heavy projecting cornice of the south tower had fallen down, in part, and the remainder was unfit to receive a new roof.

The high brick columns, extending from the cellar to the eaves of the main building, and supporting the northern wall of the south tower, were so much damaged by the fire as to require to be removed, and consequently, with them the above-mentioned wall itself. The lining of the upper story of the main building was also so much injured that the greater portion of this will require renewal. But the most unstable portion of the building, and that which gave rise to most anxiety, was the principal northern tower. This, which is 140 feet high, starts from a square base, and is gradually transformed into a regular octagon of smaller dimensions. Four sides of this octagon rest upon the sides of the original square, but project into the interior, while its other four sides extend diagonally across the angles of the square, and are supported by rough and imperfect corbel work, consisting of masses of bluestone very seriously affected by the fire. The tower was originally divided into a series of stories by transverse wooden beams and plank floors, which were entirely destroyed. The anxiety in regard to this tower was increased by observing a vertical crack extending a considerable portion of the height of the tower, but whether this had previously been produced by unequal settling, and had merely been increased by the unequal expansion of the exterior and interior walls, due to the fire, or entirely produced by the latter cause, could not be definitely ascertained. As this part of the building imperatively demanded immediate care, the architect was directed to give it his first attention. After a due consideration of its then present condition and its future use as a receptacle of heavy articles, it was considered necessary to erect within it a lining of solid brickwork 9 inches thick, laid in cement, from the bottom to the top, firmly united to the original wall, and serving as the support to iron beams of the brick floor. And, furthermore, it was concluded to fill up in brickwork a number of the high, narrow windows in each story, which would add to the strength of the structure without affecting externally its architectural appearance.

A similar construction was directed in the other principal north tower, and the work in both has been executed in such a manner as to give assurance that these parts of the building will not merely be restored, but will also be rendered more stable than they were before the conflagration. The crack above mentioned has been found, by the undisturbed condition of a thin stratum of plaster placed over it, to have remained the same, and the walls, for several months previous and during the winter, have not undergone any perceptible change.

While the work immediately required for the safety of the front towers was in progress, plans were discussed and prepared for the interior of these as well as for that of the south tower, with a view to their better adaptation to the wants of the establishment.

The original plan of the building included four principal staircases leading to the upper story of the edifice, one on each side of the north entrance, and a similar arrangement on the right and another on the left of the south entrance. As these occupied a large portion of useful space, it was thought best to increase the size of those at the north entrance, dispense with those on the southern, and so arrange the heights of the stories of all the towers as to render them more available for the business operations of the establishment.

The work which has been done on the southern tower consists in the removal of the north wall and a considerable part of the upper portion of the other three walls; the preparation of a part of the freestone, from which to reconstruct the exterior wall; the greater portion of the brickwork of the basement, and the furnishing of the cast-iron columns intended to replace the brick piers which supported the northern wall of this tower. * * *

This temporary roof, covered with felt saturated with tar, has served the purpose intended. It will, however, rapidly deteriorate, and, consequently, the first object of the committee, during the coming season, will be to decide on the character of the roof, and to hasten its completion as rapidly as the work can properly be accomplished.

In the restoration of the building the committee have been governed by the following considerations:

First. To render the work entirely stable, both in regard to material and mode of construction.

Second. To render it thoroughly fireproof.

Third. In view of the great cost at present of material and workmanship, and the condition of the funds of the Institution, at first to do such work as should be necessary to preserve the stability of the several parts of the building, and prevent injury to the property by the weather. * * *

1866. The restoration of the building has been prosecuted during the last year as rapidly as the funds at the disposal of the committee and the character of the work would permit. * * *

The large south tower was so much injured that 30 feet of the upper portion had to be taken down and rebuilt, the cost of which was much enhanced by the necessity of recutting a large amount of new stone for the facing. This tower has been divided into six stories, affording as many large rooms, the lower for an extension of the museum, an upper one for the meetings of the Regents, and the others for storage, etc. The offices for the accommodation of the Secretary and assistants will be in the nothern towers and connecting space.

The principal access to the second story of the main building is by two large iron staircases, one on either side of the northern entrance. These have been completed.

All the towers and connections with the main building have been covered with substantial roofs. After much inquiry and personal investigation, it was concluded to adopt the plan for the roof of the main building of wrought-iron framing and slate

covering, the latter secured in place by wire to iron purlines and pointed underneath by a coating of cement.

The inside lining of the walls of the second story of the building, which had been much injured by the fire, has been removed and its place supplied by a new 9-inch brick wall laid in cement, securely tied, and clamped to the outer stonework.

The chairman of the committee has given personal attention to the work in its progress and can state from actual knowledge that the plans, material, and workmanship are of a satisfactory character, alike creditable to the talents and careful supervision of Mr. Cluss, the architect.

1867. It was stated in the report presented to the Board at its last session that it was proposed, during the year 1867, to roof the main building and towers and finish the interior of all the rooms, halls, staircases, and main entrance, leaving the large room of the upper story over the museum unfinished until funds could be provided for the purpose and its future use be determined.

In accordance with this proposition the ironwork of the roof over the museum was erected early in the spring, and covered with slate, fastened to the iron purlines with wire and plastered inside with wall plaster. The iron gutters, as well as the roof, were found perfectly secure from leakage during the hardest summer rains. The severe test of ice and snow during the present winter has shown the necessity for additions in the arrangements for conducting the water from the roof. Plans for this purpose are now under discussion with the architect for persevering in the original plan, or adopting some additional security that the late severe season has indicated to be advisable.

The adaptation of new to old work in restoring the building from the destructive effects of the fire by substituting incombustible materials for wooden partitions, floors, and roofs, has been attended, as was foreseen, with much labor and expense, as well as making additional means indispensable for rendering the roof surfaces, valleys, and gutters water-tight in winter, when covered with snow and occasionally ice, as well as the summer rains. Like the public buildings generally in this city (and we may say elsewhere) where battlements extend above the eaves, with gutters behind them upon the roof, or resting upon the walls, much inconvenience, and at times damage, arises from leaks the result of such a system. It is experienced in the Smithsonian building in consequence of the stone battlements capping all its exterior walls. The present architect's original design, approved by the committee, is set forth in his report of the operations of the year annexed hereto. Neither time nor the funds of the Institution would permit his carrying this part of his plan into operation; and until it is done, together with some additions that the late inclement season has pointed out as advisable and necessary, the building is not secure, nor the property within it, from dampness and moisture.

The introduction of the proposed warming apparatus for all the apartments is the next most essential particular to be undertaken, to be commenced whenever the funds of the Institution will justify.

The security of the several apartments and contents are in a great measure dependent upon such an apparatus as a substitute for the stoves temporarily in use, and for which no permanent smoke flues or other arrangements were provided.

All the rooms in the north tower, forming three suites of three in each, with two rooms on the entrance floor, one for the janitor and the other for a reception room for visitors, have been completed and are now used and occupied as offices for conducting the operations of the Institution. The several apartments in this north tower above these offices have also been completed. The rooms and apartments in the south tower have also been finished and are now occupied. The lower one, or that on the first floor, forms a part of the general museum and is now devoted to the reception of the larger and most weighty articles of ethnology, such as the stone images from Central America and the stone sarcophagus from Syria.

The apartments on the next story have been fitted up with shelves, bins, and other fixtures for the transaction of the business of the literary and scientific exchanges, packing and distributing the same.

The apartments next above have been finished for the meetings and convenience of the Board of Regents, and those on the three remaining floors have also been finished and appropriated to storage and such other purposes as may become necessary. In this tower are also provided an elevator with convenient mechanical power for removing books, specimens, etc., to and from the basement and four stories above it, etc. * * *

To increase the accommodation two additional floors have been added to the original subdivision of the stories of the north and south towers. To furnish light to the new rooms in the south tower, circular windows have been opened through the walls, without interfering with the original architectural effect of the exterior, thus furnishing sufficient light for the purpose for which these apartments are intended.

The cost of the reconstruction during 1865, 1866, and 1867 amounted to $119,528.01, all of which was paid from Smithsonian funds, except the sum of $8,883.69 taken from the Congressional appropriation for the preservation of the Government collections.

At the Regents' meeting of January 27, 1868, it was resolved that the great hall of the second story of the building and such other rooms as are not required for the regular operations of the Institution be devoted to the preservation of the scientific collections. It should be explained in this connection that before this time the library of the Institution had been transferred to the Library of Congress, thus increasing the amount of space available for museum purposes.

A resolution was also adopted at the same meeting that a committee be appointed to report to the Regents at their next meeting what amount of appropriation should be asked of Congress for the care of the Museum and for fitting up the great hall for the safe-keeping and exhibition of specimens. On May 1, 1868, as a result of this action the following memorial was presented to Congress:

To the honorable the Senate and House of Representatives in Congress assembled:

In behalf of the Board of Regents of the Smithsonian Institution, the undersigned beg leave respectfully to submit to your honorable body the following statement, and to solicit such action in regard to it as may be deemed just and proper:

* * * * * * *

It is true that Congress, at the time the specimens were transferred to the Institution, granted an appropriation of $4,000 for their care and preservation, that being the equivalent of the estimated cost of the maintenance of these collections in the Patent Office, where they had previously been exhibited. But this sum, from the rise in prices and the expansion of the museum by the specimens obtained from about fifty exploring expeditions ordered by Congress, scarcely more than defrays at the present time one-third of the annual expense. In this estimate no account is taken of the rent of the part of the building devoted to the museum of the Government, which at a moderate estimate would be $20,000 per annum.

Besides the large expenditure which has already been made on the building, at least $50,000 more will be required to finish the large hall in the second story, necessary for the full display of the specimens of the Government. But the Regents do not think it judicious further to embarrass the active operations for several years to come by devoting a large part of the income to this object, and have therefore

LOWER MAIN HALL, SMITHSONIAN INSTITUTION BUILDING. EXHIBITION OF BIRDS AND MOLLUSKS.

concluded to allow this room to remain unfinished until other means are provided for completing it.

It is not by its castellated building nor the exhibition of the museum of the Government that the Institution has achieved its present reputation, nor by the collection and display of material objects of any kind that it has vindicated the intelligence and good faith of the Government in the administration of the trust. It is by its explorations, its researches, its publications, its distribution of specimens, and its exchanges, constituting it an active, living organization, that it has rendered itself favorably known in every part of the civilized world, has made contributions to almost every branch of science, and brought more than ever before into intimate and friendly relations the Old and New Worlds.

* * * * * * *

The Board of Regents are confident that upon a full consideration of the case, your honorable body will grant an adequate support for the collections of the Government, and also an appropriation for finishing the repairs of the building.

* * * * * * *

In conclusion, your memorialists beg leave to represent on behalf of the Board of Regents that the usual annual appropriation of $4,000 is wholly inadequate to the cost of preparing, preserving, and exhibiting the specimens, the actual expenditure for that purpose in 1867 having been over $12,000; and they take the liberty of respectfully urging on your honorable body the expediency of increasing it to $10,000, and that a further sum of $25,000 be appropriated at this session of Congress toward the completion of the hall required for the Government collections.

And your memorialists will ever pray, etc.

S. P. Chase,
Chancellor Smithsonian Institution.
Joseph Henry,
Secretary Smithsonian Institution.

In his report for the same and the succeeding year, Secretary Henry explained that the only exhibition rooms to which the general public had had admission since the fire were the large hall on the first floor of the main building and the adjoining apartment in the south tower. This large hall, containing rich collections in ornithology and ethnology, presented to the eye a succession of large pillars, which obstructed the view of the cases. In fitting up the room of corresponding dimensions in the second story, an opportunity would be afforded of adopting arrangements far better suited for a comprehensive display of the vast number of objects with which in time it would be furnished, as it was intended that the ceiling of this hall should be attached to the long iron girders which span the space from wall to wall, thus obviating the necessity for introducing columns. In addition to the above the west connecting range was provided in 1868 with cases for ethnological specimens and opened to the public in 1869. The west wing was at this time temporarily appropriated to the alcoholic specimens and miscellaneous purposes.

During each of the years 1870 and 1871, Congress appropriated $10,000 for the fitting up of the large second-story room and other work of reconstruction. Those sums, together with about $9,000 from

the income of the Smithsonian fund, $29,000 in all, were expended for that purpose in the latter year.

A readjustment of quarters in the Smithsonian building was announced by Secretary Henry in his report for 1871, as follows:

Arrangements have been made for appropriating the east wing and range to the business which may be considered as belonging exclusively to the essential objects of the Institution, and devoting the main building, west wing, and towers to the Museum. For this purpose the large room on the first floor of the east wing, which was formerly used as a museum laboratory and storeroom, has been fitted up with bins and conveniences for assorting and packing the literary and scientific exchanges to be sent to foreign countries. Preparation has also been made for removing the chemical laboratory from the first floor of the east range to the space immediately below it in the basement, and for applying the whole of the first floor of this part of the building to the business offices of the Secretary and his assistants in the line of what are called the "active operations."

For the special accommodation of the Museum the large room in the west wing, formerly occupied by the library, has been prepared for the reception of cases for mineralogical and geological specimens, while the great hall, 200 feet by 50, in the second story of the main building, has been completed and is now ready to receive the cases for the anthropological and other specimens.

Estimates are now before Congress for fitting up these rooms with cases for the reception and display of the Government collections, and it is hoped that in the next report we shall be able to chronicle the commencement, if not the completion, of the work.

The changes consequent upon the extension of the Museum mentioned made a rearrangement necessary of the greater part of the basement, so as to obtain additional security against fire and greater convenience for the storage of fuel, packing boxes, and specimens. A floor was laid through the basement, and new passageways opened, furnishing better access from one extreme of the building to the other. In introducing the fireproof floor into the west wing, advantage was taken of the opportunity to increase the height of the room below it, and to convert it and the adjoining rooms in the west range into laboratories and storerooms for natural history.

Furthermore, for better security, the fireproofing of the floors of the four towers on the corners of the main building has been commenced. The rooms in the towers furnish studies and dormitories for the investigators in the line of natural history who resort to the Institution, especially during the winter, to enjoy the use of the library and the collections for special researches.

* * * * * * *

For defraying the expenses of the care and exhibition of the National Museum, Congress has annually, for the last two years, appropriated $10,000. Although this appropriation was more than double that of previous years, still it fell short of the actual expenditure. The amount of items chargeable to the Museum during the past year, independent of the rent which might have been charged for the rooms occupied, or for repairs of the building, was a little more than $13,000. Deducting from this sum the $10,000 appropriated by Congress, there remains $3,000, which was paid from the income of the Smithson fund.

A statement of this deficiency has been presented to Congress, and we trust that the sum of $15,000 will be appropriated for the same purpose for the ensuing fiscal year.

By the completion of the large room in the second story and the appropriation of the west wing and connecting range to the same purpose, the space allotted to the

GALLERIES IN LOWER MAIN HALL, SMITHSONIAN INSTITUTION BUILDING. USED AS LABORATORIES OF NATURAL HISTORY.

Museum in the Smithson building has been increased to about threefold. It is proposed, as was stated in the last report, to devote the room in the west wing to specimens of geology and mineralogy, and the large room in the second story to specimens of archæology and paleontology. As preparatory to the fitting up of these rooms, a series of designs has been prepared at the expense of the Institution by B. Waterhouse Hawkins, the well-known restorer of the ancient animals which illustrate the paleontology of the Sydenham Palace, near London.

ALTERATIONS AND REPAIRS SUBSEQUENT TO 1877.

On December 10, 1877, the President of the United States transmitted to Congress the report of a commission, consisting of Lieut. Col. Thomas L. Casey, U. S. Army, the Supervising Architect of the Treasury, and the Architect of the Capitol, appointed by him on September 27, 1877, to examine the several public buildings in this city and determine the nature and extent of their security against conflagrations and the measures to be taken to guard the buildings and their contents from destruction or damage by fire. This commission recommended in respect to the Smithsonian building that—

All the combustible materials used in the construction of the museum portion of the building should be removed and the parts renewed of fireproof construction, and the openings connecting with other parts of the building should be supplied with fireproof doors.

On the same date the Secretary of the Interior submitted to Congress an estimate "to provide additional security against fire in the Smithsonian building for the Government collections, $3,000," and on March 27, 1878, Secretary Henry wrote as follows to Senator A. A. Sargent:

I have the honor to inform you that shortly after the fire at the Patent Office the Smithsonian building was visited by the Government committee of inspection and suggestions made by them as to the fireproofing of the portion of the edifice devoted to the collections of the National Museum. These suggestions were at once acted upon, at an expense of $2,803.29, as per detailed memorandum herewith, and I write to beg that you will kindly consider the propriety of having an item introduced into the deficiency bill whereby the Smithson fund may be reimbursed for this outlay.

The action taken was described as follows:

Attention having been specially called to the condition of the public buildings in this city on account of the destruction by fire of part of the Patent Office, it was deemed advisable to give additional security to the valuable collections deposited in the Smithsonian edifice. The main building, which contains the National Museum, is entirely fireproof, but the connecting ranges and the two wings are not so. It was therefore highly desirable that the main building should be entirely isolated from the ranges and wings. For this purpose the large windows facing the wings were bricked up and all the doorways leading from the museum into the ranges either bricked up or fitted with iron instead of wooden doors. The carpenter's and machinist's shops were removed to the main basement and inclosed in brick walls. The storage rooms were made fireproof by replacing wooden partitions and floors by those of brick. In the high central tower brick partitions have been constructed on the stairways, to prevent the passage of fire from one story to another.

Secretary Baird also refers to this subject as follows in his report for 1880:

The Smithsonian building was one of those carefully examined by the commission, and it was recommended that iron doors should be placed in the passageways between certain rooms. An appropriation of $3,000 was subsequently[a] made by Congress for this purpose; and a contract for its execution was accordingly entered into with Mr. George L. Damon, of Boston. After considerable delay in the performance of this contract, the doors were delivered and put in place by Mr. Damon, to the entire satisfaction of the executive committee. This arrangement has greatly promoted the safety of the building and its contents from the risk of the spreading of any fires which might accidentally occur within its walls. A few additional changes are still desirable to give still further security to the public property placed in the charge of the Institution.

In his report for 1879 Secretary Baird writes that during the year other alterations had been made in order to increase the efficiency of the building and reduce the expense of superintendence and maintenance. The document room had been enlarged and refitted. The eastern wing, formerly used by Secretary Henry as a residence, had been converted into a series of offices. Eleven large fireproof doors had been placed in the building to isolate the different wings and floors. The laboratory had been rearranged and many other improvements made, and it was believed that the building was then in a condition of thorough efficiency and adaptation to its scientific purposes.

In each succeeding report mention is made of necessary repairs and alterations of greater or less extent, at the cost of the Smithsonian fund, but the annual expenditure for these purposes was generally small. Secretary Baird reported in 1881 that—

At no distant time some expensive work of renovation will be required upon the ceiling of the great hall in the second story of the main building, as in some places the plaster appears in danger of falling off and injuring the cases and specimens on exhibition below.

In 1882 somewhat extensive changes were made at the west end of the building. The basement under the west wing, which had previously been occupied indiscriminately for the preservation and elaboration of the collection of birds and fishes, was subdivided, and each subject confined strictly to its own section.

The western corridor was also at this time fitted up as an exhibition hall for fishes.

At the meeting of the Board of Regents held January 18, 1882, Secretary Baird called attention to the combustible and insecure condition of the eastern portion of the Smithsonian building, and presented plans, prepared at his request by the architects, Messrs. Cluss & Schulze, which, without materially changing the architecture of the building, would provide largely increased accommodations for

[a] Sundry civil act for 1880.

offices and workrooms, the storage of publications, the exchange system, etc.

The Board unanimously adopted a resolution, instructing the Secretary and executive committee to present the subject to Congress and request an appropriation for the purpose. The Secretary, in accordance with this instruction, sent the following letter on the 13th of March to the Speaker of the House of Representatives:

Hon. J. W. Keifer,
Speaker of the House of Representatives.

Sir: By instruction of the Board of Regents of the Smithsonian Institution, I have the honor to transmit to Congress the following resolution, adopted at the last meeting of the Board, January 18, 1882, and, in doing so, beg that it be referred to the appropriate committee of the House of Representatives and receive that attention which the urgency of the case requires:

"*Resolved*, That the Secretary and executive committee present a memorial to Congress showing the importance and necessity of rendering the east wing of the Smithsonian building fireproof, requesting an appropriation therefor, and, if the means are furnished, to proceed with the work."

It will be remembered that in January, 1865, a fire occurred in the Smithsonian building, which destroyed a large portion of the main edifice, with its adjacent towers, and a very large amount of valuable public and private property.

The main building was restored with fireproof materials, but the east wing, composed entirely of wood and plaster, and which had escaped injury, remains in its previous dangerous condition. Originally a lecture room, it was fitted up many years ago with apartments for the residence of the late Secretary and his family. This application of the wing, however, was discontinued after Professor Henry's death; but the rooms thus set apart are entirely unsuited to the operations of the establishment, and, while in every way objectionable, the timbers have decayed and no arrangements are provided for proper lighting, heating, and ventilation.

The main building and western extension are occupied by the collections of the Government; the east wing embraces the offices of the Secretary, chief clerk, corresponding clerk, and registrar, and also accommodations for the extensive operations of the department of international exchanges, the benefits of which accrue not only principally to the Library of Congress, but to all the public libraries and scientific societies throughout the United States. The rooms are filled with the archives, files of correspondence, original scientific manuscripts, vouchers, the stock of Government and Smithsonian publications for distribution at home and abroad, etc., and their destruction by fire, to which they are constantly exposed, would be greatly detrimental to the interests of the Government and the general public.

In addition to this, an extensive fire in the east wing would endanger and possibly destroy the main portion of the Smithsonian building, the upper and lower halls of which contain rare specimens belonging to the Government, and most of which could not be replaced.

Congress has recognized the importance and propriety of gradually reconstructing the interior of the Smithsonian building, in fireproof materials, by making appropriations for the purpose at various times between 1870 and 1875; and the last Congress, in 1879, appropriated $3,000 "for providing additional security against fire in the Smithsonian building."

It is now proposed to remodel the interior of the east wing, so that without disturbing its present architectural style, the internal capacity will be doubled by a new arrangement of floors, partitions, and roofs, and all the rooms be adapted to the effi-

cient prosecution of the work of the Institution and the various interests intrusted to its management by Congress.

Inclosed I beg to send a copy of the report of the board of fire inspectors (appointed by the District Commissioners) upon the condition of the Smithsonian building. I have the honor to ask, in the name and on behalf of the Board of Regents that the following appropriation be made at the present session of Congress, viz, "For continuing and completing the fireproofing of the Smithsonian Institution, $50,000."

I am, very respectfully, your obedient servant,

SPENCER F. BAIRD, *Secretary.*

[Extract.]

WASHINGTON, D. C., *March 13, 1882.*

The COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

GENTLEMEN: The commission to inspect buildings in the District beg leave to submit herewith report No. 5.

By invitation of Professor Baird, the east wing and connecting corridor to the main building of the Smithsonian Institution was visited and inspected. In this portion of the building are all the records and valuable documents belonging to the Institution. The interior is entirely of wood and illy arranged, making it especially unsafe and liable to accident from fire, thus endangering the entire building. As a matter of safety, this wing and corrider should be completely cleared out and rebuilt of fireproof material and furnished with improved modes of communication and egress.

Official extract furnished Prof. S. F. Baird.

WILLIAM TINDALL,
Secretary Commissioners District of Columbia.

The above memorial received favorable consideration by the Forty-seventh Congress, resulting in the passage of the following item in the sundry civil act for 1884:

For completing the reconstruction, in a fireproof manner, of the interior of the eastern portion of the Smithsonian Institution, $50,000. (Stat. XXII, 628.)

The preparation of plans, the details of construction, etc., were placed in charge of Messrs. Cluss & Schulze, architects. Proposals were asked and the bids opened on April 26, 1883. The removal of the contents of the east wing and corridor was soon effected, the offices of clerks and others were transferred to the large adjacent exhibition hall, and accommodations for storage were provided by the erection of a temporary shed on the south side of the Smithsonian building.

In 1883 Secretary Baird reported that—

The appropriation was found sufficient to secure the fireproofing of the building, but a number of other desirable objects remain to be secured, such as a heating apparatus, a passenger elevator, a freight lift; the introduction of speaking tubes, electric bells, telephones, a concrete floor in the basement, an underground communication between the Smithsonian and the new Museum buildings, etc., for which an additional appropriation of $15,000 has been asked.

Two subsequent appropriations were granted by Congress with reference to these changes, as follows:

For finishing, heating, gas fitting, plumbing, and completely furnishing the eastern portion of the Smithsonian Institution, and for finishing the fourth and fifth stories, including liabilities already incurred, $15,000. (Sundry civil act for 1885.)

WEST RANGE, SMITHSONIAN INSTITUTION BUILDING. EXHIBITION OF INSECTS.

For finishing and completing the furnishing of the eastern portion of the Smithsonian Institution building, $5,600. (Sundry civil act for 1886.)

In his report for 1884 Secretary Baird announced the expenditure of the appropriation of $15,000 in fitting up the two upper stories of the building, which had been necessarily left unfinished for lack of funds. This included the introduction of iron furring and iron lathing for the ceilings immediately under the roof, and the fitting up of many of the rooms for their special requirements. The rooms in the reconstructed portion were then all occupied for the general purposes of the Institution, notably the departments of administration, of international and miscellaneous exchanges, of the reference library, of transportation, and of publication, the chemical laboratory, etc.

In transferring the offices back to the east end considerable changes were made in the lower hall of the main building, including the removal of all exhibition cases in the galleries, which have since been used exclusively for laboratory and storage purposes by several departments of zoology. Telephones, speaking tubes, an accurate time service, and other minor conveniences were also introduced at the eastern end.

The report of the Secretary for 1885 notes the completion of the alterations in the east wing and corridor in a thoroughly fireproof manner, with twice the original number of available office rooms, and with every facility for doing the work mentioned in the best possible manner. It also calls attention to the unsightly and dilapidated condition of the remainder of the building, used by the Museum, which will soon require extensive repairs.

In accordance with estimates submitted, the sundry civil act for 1888 provided "for urgent and necessary repairs to central and western portions of the Smithsonian Institution building, $15,000." In a letter to the chairman of the House Committee on Appropriations, dated December 11, 1886, and in his annual report for 1887, Secretary Baird explained the reasons for the proposed changes, stating that the floors, ceilings, and roof of the west corridor were the same as in the original construction and not fireproof, being in fact very combustible. Nearly all of the large alcoholic collections of the National Museum and the Fish Commission were in or adjacent to this part of the building, so that should a fire break out it would result not only in serious damage to the building, but also in the entire destruction of extensive and valuable portions of the national collections. He also called attention to the fact that, though the Smithsonian building was constructed at the expense of the Smithsonian fund, it had since 1858 been almost wholly given over to the purposes of the National Museum.

The fireproofing was intrusted to Messrs. Cluss & Schulze, architects, from whose report the following account of the work is taken.

The reconstruction extended over the curtain between the main building and the west wing, a building of 60 feet in length and 54 feet in width, with an adjoining turret containing stairs. It contains a basement where alcoholic specimens are kept.

The main story is mostly occupied by an exhibition hall, extending up into the roof, with a clerestory. Along the north front was originally an open cloister, which had been for many years temporarily fitted up by framework for offices.

Permanent provision was made for these purposes, and a mezzanine story formed by the insertion of a fireproof upper floor.

Besides the old, rotten, combustible floors and roofs, a complicated system of decorative hollow columns and vaults, framed of wooden scantlings, boards, and lathed plastering, had to be carefully removed, so as not to injure the outside walls, consisting of a thin cut-stone facing, backed by ordinary rubblework.

In the reconstruction the Romanesque general character of the building was preserved with the greatest simplicity compatible with the surroundings, and also made a necessity by the limited appropriation in conjunction with the increased cost of decorations in the fireproof materials.

The fact that the west wing and the central part of the Smithsonian building had never been made entirely fireproof was communicated to the Regents by Secretary Langley in his report for 1888, in which attention was also called to the proximity of much inflammable material. He likewise explained that for certain reasons the fireproofing of the west wing was the more urgent. References to this subject were again made in the Secretary's reports for 1889 and 1890, and the importance was urged of gaining additional light in the center of the main building by the construction of a skylight in the roof and a wellhole through the second floor.

As these parts of the building were used for the National Museum, an appropriation for the proposed changes was asked of Congress, beginning in May, 1888, Senator Morrill, a Regent of the Institution, pressing the matter with his customary energy. The first bills, relating mainly to the west wing, were passed by the Senate twice during the Fiftieth Congress (ending March 4, 1889), but failed of action in the House.

The question was again brought up in the Fifty-first Congress (1889–1891), originating in the Senate, and was discussed in several forms. The most comprehensive measure and the one carrying the largest appropriation was Senate bill No. 2033, reported on January 27, 1890, by Senator Morrill. Its wording was as follows:

That, for the purpose of fireproofing the roof of the main hall, and that of the so-called chapel in the west wing of the Smithsonian building, and to put in a skylight and a wellhole to admit light into the central portion of the lower hall of said building, and also to replace some woodwork of the towers, and other repairs, said work to be done under the direction of the Architect of the Capitol with the approval of the Regents of the Smithsonian Institution, the sum of $45,000 shall be, and

hereby is, appropriated out of any moneys in the Treasury not otherwise appropriated.

On March 6, 1890, Secretary Langley addressed a letter to the chairman of the House Committee on Public Buildings and Grounds, on the subject of the above bill, in which he says that the $45,000 is asked to complete the fireproofing and repair of a part of the building which for a long period has been almost entirely given over to Government purposes rent free. Following are quotations from the same letter:

The portions of the building which are not fireproof are—

The roof of the so-called "chapel" in the west wing, which contains collections whose mere money value is estimated at over $250,000, but whose value to science is inestimable. This is also the only portion of the building which is suitable to devote to donations of art objects, which may be expected when the Government provides a safe depository for them.

The ceiling and part of the roof of the main exhibition hall, now occupied by probably the most extensive and valuable archæological collection in the United States, is of combustible material and in urgent need of repairs, the ceiling threatening to fall, in part, and crush the cases and their valuable contents and possibly endanger the safety of visitors and employees. Both roofs are leaking, and these changes involve the replastering and repainting of the walls.

The floor of the main hall, 200 by 50 feet, is worn out and needs renewal, and all this implies special temporary provision for the collection.

The lower hall is now very dark, and in replacing the roof and ceiling of the upper story it is desirable that a large skylight and wellhole be inserted, which would greatly add to the comfort of visitors by increasing the light and providing better ventilation.

The rooms occupied by the Bureau of International Exchanges are in less need of repair, but some portion of the amount asked is intended to be devoted to the extreme east wing, occupied by these offices.

In addition to what has been mentioned, there are wooden floors and other woodwork in the towers which are a source of danger, and it is to be observed that, owing to the crowded condition of the Museum, it has been necessary to erect a paint shop filled with combustible material immediately against the south wall of the building and close to the roof, whose dangerous condition has just been described. The present state of things is one of continual menace.

The bill as finally enacted into law, as an item in the sundry civil act for 1891, was as follows:

For fireproofing the so-called chapel of the west wing of the Smithsonian building, and for repairing the roof of the main building and the ceiling and plastering of the main hall of the building, $25,000, said work to be done under the supervision of the Architect of the Capitol, with the approval of the Regents of the Smithsonian Institution, and no portion of the appropriation to be used for skylights in the roof nor for wellhole in the floor of the main building, $25,000. (Stat. XXVI, 383.)

In his report for 1891 Secretary Langley announces gratifying progress in the changes and repairs up to June 30, 1891, consisting in the entire replacement of the roof of the west wing with a substantial construction of iron and slate and the repairing of the roof and of

the ceiling and plastering of the upper hall of the main building. By the close of the fiscal year 1892 this work was practically completed, though with the expenditure of only a part of the appropriation, and in his report for that year Secretary Langley states:

I would especially urge that the balance of this appropriation, unexpended by reason of a limiting clause introduced in the act, on account of which the money is not available for certain repairs originally contemplated, should be now made available by Congress for increasing the storage room in the east wing of the building, and at the same time that certain rooms be fitted for the special needs of the Government Exchange Bureau, now occupying rooms in the main building urgently needed for other purposes.

This request was granted by Congress in the sundry civil act for 1894, as follows:

For completing the repairs upon the Smithsonian building, and for such other work as is needed to protect the building from further deterioration and to place it in proper sanitary condition, any unexpended balance remaining to the credit of the appropriation for fireproofing, etc., shall be available for the purposes above stated; this work to be done under the direction of the Architect of the Capitol and in accordance with the approval of the Secretary of the Smithsonian Institution. (Stat. XXVII, 582.)

The use made of the unexpended balance above referred to is thus described in the report of the Secretary for 1893:

A restrictive clause contained in the appropriation of August 30, 1890, for repairs to the Smithsonian building was removed by a clause in the sundry civil act for the year ending June 30, 1894, so that a portion of the amount unexpended became available for making necessary repairs to the roof of the eastern wing and improving the sanitary condition of the building, as well as for increasing the space available for storing documents and handling the Government exchanges. The plumbing in the eastern part of the building has been thoroughly overhauled and a suite of dark and damp rooms in the basement, on the south side, has been transformed into well-lighted and comfortable offices, thus freeing several rooms upon the first floor, needed for other purposes, and making it possible to handle more expeditiously the great number of books passing through the exchange office, though even with these new rooms additional storeroom for the Government exchanges will be called for at no distant day.

Other small changes at the east end of the building, made mainly at the expense of the Smithsonian fund, are described as follows in the reports for 1894 and 1895:

The narrow windows and the small diamond panes of glass admit so little light that in winter days some of the rooms where clerical work is carried on need to be artificially lighted, and in all cases the occupants lose the advantage of what ought to be abundant light, considering their open surroundings in the middle of a park. I think it well to state that while I should have made many more changes in the interest of the comfort and health of the clerical occupants of the building if I had had the means to do so, I have never felt at liberty to alter the external appearance of the building when alteration could possibly be avoided, and I have therefore never authorized the enlargement of any of the apertures in the stone work or made any changes of this kind which could be understood as modifying the structural features (except in improving the sanitary conditions of the basement), and when any change

WEST HALL, SMITHSONIAN INSTITUTION BUILDING. EXHIBITION OF MARINE INVERTEBRATES.

is mentioned here it will always be understood that it is essentially the work of the carpenter in providing for larger inside frames and larger lights in the sashes and in like alterations.

Thus, in the east wing of the building, in the fourth story, a room for containing the archives of the Institution has been provided, which is well lighted by one of the few large windows the building possesses and which has been fitted for more convenient reference to the records of the Institution. The second floor has been made brighter by repainting and by some additional floor lights in the third floor, and the windows in the room especially set apart for the safe-keeping of the engravings and books of art belonging to the Institution have been thus enlarged, while some of the rooms on the second floor have been improved by slight alterations in the window frames. On the first floor additional quarters were provided for the library in the rooms which were vacated by the transfer of the exchange department to the lower floor.

In continuing much-needed improvements in the east wing of the Smithsonian building, especially with a view to better light and ventilation, the lighting of the rooms on the first floor occupied by the library has been greatly improved by enlarging the window frames and replacing the small diamond panes by single sheets of glass. Similar changes have been made in the Secretary's office, on the second floor, as well as in some of the rooms on the third and fourth floors. Several rooms on the fourth floor, heretofore of no use except for storage, have been made habitable and have proved useful for various needed purposes.

The sanitary condition of the building has been improved by the removal of certain objectionable features and by the installation of a comprehensive system of ventilation by which pure air at an equable temperature is assured in most of the office rooms. Work upon this was well advanced at the close of the year.

Another great improvement added during the year is the introduction of electric lights in all the offices of the east wing, the electric power being supplied by a special plant, which, with the ventilating apparatus, has been placed in the basement of the south tower, where considerable changes were made for their accommodation.

Since the above dates the only alterations which need be mentioned in this connection have been the replacement of the wooden floor in the lower main exhibition hall with a terrazzo pavement, the fitting up of the children's room on the main floor of the south tower, the improvement of the conditions on all the other floors of the same tower, and the construction of a tunnel between the Smithsonian and Museum buildings, which, while intended primarily for the heating pipes, electric wires, etc., has been made sufficiently large to serve as a general passageway.

On the other hand, it is to be noted, with regret, that the upper main exhibition hall, devoted to prehistoric archæology, had to be closed in 1902 because of the loosening and fall of plaster over a large part of the ceiling and walls. The room was at once recognized to be unsafe for the admission of the public, and its appearance was extremely unsightly. Provisional repairs, to the extent possible from the regular appropriation, have recently been completed, and the hall will soon again be made serviceable, but a considerable expenditure would be required to place it in thoroughly good condition.

SMITHSONIAN BUILDING.

DESCRIPTION.

Exterior.—The building erected for the Smithsonian Institution, in accordance with the design prepared by Mr. James Renwick, jr., architect, of New York City, is in the later Norman or, as it may with more strict propriety be called, the Lombard style, as it prevailed in Germany, Normandy, and southern Europe in the last half of the twelfth century; the latest variety of the rounded style, as it is found immediately anterior to the merging of that manner in the early Gothic. In the general design and most of the details the architect adhered to the period to which this style is referable. The general feeling, however, which permeates the design, especially in the upper towers, is that of a somewhat later era, when all lingering reminiscences of the post and lintel manner had been discarded and the ruling principles of arch architecture were recognized and carried out. The semicircular arch stilted is employed throughout in doors, windows, and other openings. The windows are without elaborately traceried heads. The buttresses are not a prominent feature and have no surmounting pinnacles. The weather moldings consist of corbel courses, with bold projection. The towers are of various shapes and sizes. The main entrance on the north, sheltered by a carriage porch, is between two towers of unequal height.

In his description of the plan in Hints on Public Architecture, Doctor Owen states:

> I am not acquainted with any actual example yet remaining from what has been variously called the Lombard, the Norman, the Romanesque, and the Byzantine school, with which the Smithsonian building will not favorably compare. In so far as the architect has permitted himself to innovate upon ancient precedents from the style in which he designed, he has done so, in my judgment, with discretion and advantage. * * * I esteem myself fortunate in being able in this book to refer to an actual example, at our seat of government, the architect of which seems to me to have struck into the right road, to have made a step in advance, and to have given us in his design not a little of what may be fitting and appropriate in any manner (should the genius of our country hereafter work such out) that shall deserve to be named as a national style of architecture for America.

The design as originally carried out consisted of a main central building, two stories high, and of two lateral wings of a single story, connected with the main building by intervening ranges, each of the latter having a cloister, with open stone screen, on the north front. The only important changes since made have been the reconstruction of the east wing and range, which are now four and three stories high, respectively, the closing in with stone of the western cloister so as to adapt it to laboratory purposes, and the completion of the fireproofing of the building.

The extreme length of the building from east to west is 447 feet. The main structure is 205 feet long by 57 feet wide and 58 feet high to the top of its corbel course, though, including the main north and south towers and the carriage porch, it attains at the center an extreme width of 160 feet. The east wing is 82 by 52 feet, the west wing, including its projecting apse, 84 by 40 feet and 38 feet high, while each of the connecting ranges is 60 by 49 feet.

The main building has in the center of its north front two towers, of which the higher reaches an elevation of 145 feet. In the middle of the south front is a single massive tower 37 feet square, including buttresses, and 91 feet high. At its northeast corner stands a double campanile, 17 feet square and 117 feet high to the top of its finial, at its southwest corner is an octagonal tower finished with open work above, and at its southeast and northwest corners are two smaller towers. There is also a small tower at the northwest corner of the west wing.

The location of the building is the center of the original Smithsonian reservation, or the southern and higher part of the so-called Smithsonian Park, about 20 feet above the average level of Pennsylvania avenue. The material of which the building is constructed is a fine grade of freestone, of the lilac-gray variety, obtained from quarries in the new red sandstone near the mouth of Seneca Creek, a tributary of the Potomac River, about 23 miles above Washington. The faces of the building are finished in ashlar, laid in courses from 10 to 15 inches high.

At the present time it would not be considered appropriate to design a building of this character for museum purposes, because, while most of the exhibition halls are more or less adapted to their requirements, there is too much waste space, too many dark places, wholly inadequate accommodations for storage, and few rooms suitable for laboratories, the latter also being mainly inconvenient of access. The windows were glazed in the beginning with small square pieces of glass, set diamond shape in wooden frames, quite in keeping with the style of architecture, though admitting less light than larger panes. This manner of glazing has been retained, except at the eastern end, where, at the time of reconstruction, single lights were mainly substituted.

The building was originally constructed in what seemed to be a thoroughly substantial manner, but these qualities were mainly confined to the outer walls and the floors. Subsequent reconstructions have greatly tended to increase its stability, and the building throughout is now practically fireproof. This has resulted from the introduction of fireproof construction and of iron doors, by means of which any part of the building can readily be cut off from the remainder.

The foundations are very substantial and the walls of the building very thick, as would be necessary in a structure of this kind. The roofs, except on the connecting ranges, are slated.

Interior.—As first planned, the Museum was to occupy only the large upper main hall in the Smithsonian building, the room now and for many years past used for the exhibition collections of prehistoric archæology. The corresponding hall on the main floor was to be divided equally between the library and a large lecture room, while the west hall and connecting range were specially constructed for the gallery of art. The east hall and range, one story in height, contained the smaller lecture room, laboratories, and rooms for apparatus.

During the progress of the work of building and fitting up, however, all of these proposed arrangements were changed, either permanently or temporarily, the assignments of space at the time of the fire of 1865 having been as follows: The east wing was separated into two stories, the upper of which was divided into a suite of rooms for the accommodation of the Secretary and his family. The lower story consisted principally of a single large room, appropriated to the storage of publications and their reception and distribution in connection with the system of exchanges. The upper story of the eastern connecting range contained a number of small apartments devoted to the operations in natural history, and the lower story was fitted up as a working laboratory.

The upper story of the main building was divided into a lecture room, capable of holding 2,000 persons, and two additional rooms, at the ends, 50 feet square, one of which contained a museum of apparatus and the other a gallery of art. Both were occasionally used as minor lecture rooms and for the meetings of scientific, educational, and industrial associations. In 1868, after the rebuilding made necessary by the fire, this entire story was assigned to the Museum by a resolution of the Board of Regents. The lower story of the main building, consisting of one large hall, was unoccupied at first, but as the means for furnishing were provided it was utilized for the exhibition of natural history and other collections, the specimens from the Patent Office having been mainly transferred to these quarters in 1858.

The west wing was occupied by the library until its transfer to the Library of Congress in 1866, while the west range was used as a reading room. The tower rooms were utilized for various purposes, one large room in the south tower being assigned to the meetings of the Establishment and the Board of Regents, and three rooms in the north tower to the offices of the Secretary.

Since the fire of 1865 there have been even greater changes, as detailed in the foregoing historical account. By 1871 the administrative offices had become practically segregated in the east wing and range, commonly designated together as the "east end," which was

PRINT ROOM, SMITHSONIAN INSTITUTION.

fireproofed and considerably enlarged at the time of its rebuilding in 1884. In 1871 nearly all the remainder of the building was given over to the purposes of the National Museum.

At the east end are now the offices of the Secretary and of the parent institution, as well as those for the general administration of the Government branches under the direction of the Institution, the offices of the exchange service and of the international catalogue of scientific literature, and rooms for that part of the Smithsonian library which is retained at the Institution. In this part of the building are also several rooms used conjointly with the Museum, such as the disbursing office, the quarters of the registrar and the shipping clerk, and apartments for the storage and distribution of documents.

Immediately inside the principal or northern entrance of the main building is an octagonal vestibule between 17 and 18 feet across, at each side of which is a small room about 15 feet square occupied by the watch force and as an office of superintendence. Next follows a long and high hall containing two iron stairways leading to the upper stories. The main lower hall, which measures about 200 feet long by 50 feet wide and 23 feet 8 inches high, might be expected to present exceptional advantages for the exhibition of collections, yet it has several very marked defects. The large windows (14 feet 10 inches high by 4 feet 5 inches wide), reaching from about 4 feet 5 inches above the floor to within the same distance of the paneled ceiling, afford abundant light at the ends, but in the center of the room on both the north and south sides there is a long blank wall necessitating artificial lighting over a considerable space. Furthermore, the ceiling of the room is supported by two rows of very heavy ornamental columns (3 feet 3 inches wide, 8 feet 9 inches apart, and about 14 feet distant from the walls) which unite in a series of arches above. Between these columns and the outer walls, at a height of 8 feet from the floor, are four galleries, 15 feet wide, which extend from the ends of the hall to the central dark area, and both these columns and galleries are further means of darkening the middle aisle of the room.

Except at the sides of the entrances, where they are arranged in a large quadrangle illuminated by incandescent electric lamps, the cases forming the main series in this hall extend from pillar to wall and from the floor to the gallery so as to form successive bays or alcoves, each lighted by a single window. In some of the alcoves there are also small square cases, with groups of specimens, and all of the above are used for the exhibition of birds. Extending through the central aisle is a series of unit cases, with sloping and upright tops, for the display and storage of mollusks.

A passageway from the middle of the hall leads to a small room, about 25 by 23 feet, forming the main floor of the south tower, the exterior entrance to which has been closed. This room has been

transformed into the so-called children's room, with a mosaic floor, the walls painted in several tints of green, and the ceiling covered with an arbor and vine. Low, light-colored cases, almost wholly of glass, contain a series of specimens, mostly animal, chosen to excite the wonder of children, besides which there are several paintings upon the walls and two aquaria with living fishes.

Adjoining the main hall on the west is the west range (60 by 37 feet), one story high, but surmounted by a clerestory. The side roofs are supported by two rows of columns, similar to those in the main hall but not so heavy, being 6 feet apart and about 8 feet 2 inches from the side walls. The windows are confined to the south wall. Upright cases form alcoves along the sides of the room, while flat-topped table cases occupy the central aisle. This range has recently been given over to the exhibition of insects. It previously contained the fishes and was originally connected with the library as a reading room.

The western hall follows and has for a number of years been devoted to the display of marine invertebrates exclusive of the mollusks, with extensive provisions for the storage of specimens. It has the appearance of a chapel, by which name it is often designated. It is relatively very high, with an arched ceiling and skylight, and terminates at the northern end in an apse. Its dimensions, not including the apse, are: Length, about 66 feet; width, 35 feet; greatest height, 37 feet 8 inches. There are windows well up on the south and west sides and lower ones in the apse, but none on the east. High up on the south wall is a handsome rose window. This room, together with the adjoining range, was planned to contain the gallery of art, but from the time of its completion until 1866 it was occupied by the library. Now upright cases of black walnut occupy the wall space on all sides, except in the apse, which contains a synoptical collection displayed in small cases. The body of the hall has three rows of flat-topped and high, square cases, on unit bases fitted with storage drawers. The small adjoining tower is also used for the storage of marine invertebrates.

The old cloister to the north of the west range, originally open at the front, was inclosed with wood at an early date; but when this part of the building was fireproofed, the woodwork was replaced with stone. The room thus gained is divided into two well-lighted apartments, used as laboratories for fishes and marine invertebrates.

The second flo ", as designated on the plans, contains the galleries of the main lower hall already described. At the head of the first flight of stairs from the main entrance are three small rooms used as natural-history studies, and at a corresponding height in the south tower is a room fitted up by the Smithsonian Institution for its collection of apparatus. There is also a low second-story room over the western cloister, used for the storage of fishes.

MAIN UPPER HALL, SMITHSONIAN INSTITUTION BUILDING. EXHIBITION OF PREHISTORIC ARCHEOLOGY.

Properly speaking, the third floor, so named on the plans, is, for the main part of the building, only the second floor. It consists of a single large room of the same size as the lower main hall, being thus about 200 feet long by 50 feet wide and 29 feet 3 inches high. Formerly it contained the picture gallery, a lecture hall, and a museum of apparatus, but soon after the restoration succeeding the fire of 1865 it was turned over to the department of prehistoric archæology, which has occupied it ever since. It is one of the finest halls in the possession of the Museum, but for a long time it has been in bad condition, owing chiefly to the loosening and fall of plaster. The extensive repairs made necessary on this account have, however, recently been finished. As the ceiling is supported from the roof, the hall contains no pillars, and there are no galleries, so that the space is entirely clear; and while the windows bear the same relations to the central space as in the lower hall, the light is more freely distributed. The cases are of several old patterns, not permitting of a satisfactory installation, especially considering the height of the room, which, with proper treatment, could be made exceedingly effective. In the north tower on this level are three small rooms used as the laboratories for prehistoric archæology, and in the south tower is the Regents' room.

The floor of the north towers and intervening space next above the archæological workrooms comprises a suite of three similar rooms, occupied as laboratories for conchology. Three succeeding floors in the same towers, containing six rooms in all, are utilized as storerooms for mollusks and other marine invertebrates. Above these in the taller tower are still six stories, but their high position renders them practically unserviceable. The three floors which succeed the Regents' room in the south tower are all used for the storage of publications.

While the basement is of good height, only the eastern part is in proper condition, the central and western parts requiring to be thoroughly renovated, including the building of broad areas along the exterior to assist in the lighting and ventilation. The heating plant is near the center of the basement, but now serves only in a supplementary capacity. In the north tower are the toilet rooms. To the eastward from there the basement is mainly used by the Smithsonian Institution and the International Exchange Service; to the westward all the available space is given over to Museum storage. There are seven small rooms and one large room, one of the former being used for supplies, while all the remainder are overfilled with specimens in the several groups of birds, fishes, mollusks, and marine invertebrates. With the exception of the birds, the specimens are mainly alcoholic. These collections are very large and of great value, but they require at least twice the present amount of space for their safe arrangement, and the darkness and dampness of the rooms unfit them for purposes of study.

NATURAL-HISTORY WORKSHOP.

In order to provide more extensive and more suitable quarters for the preparators and photographer of the Museum, with immediate reference to preparations for the Philadelphia Centennial Exhibition, a small two-story brick building was constructed in 1875 on the Mall, a short distance west of the southwestern corner of the Smithsonian building. It consists of a main structure, about 30 by 27½ feet, and of two wings, each about 28 by 17 feet, on the east and west sides. The latter have been used as a stable and a carriage house and were somewhat enlarged in 1901 and 1902 at the expense of the Smithsonian fund, their present dimensions being those given above. The original Congressional appropriation for this building amounted to $3,000, but, proving inadequate and in order to hasten its completion, the Institution advanced an additional sum of $3,927.84, which was refunded by Congress in 1877.

The upper part of the main building was fitted up as a photographic laboratory, the remainder of the main building, with its basement and the rooms over the carriage house, being assigned to the work of taxidermy, preparation of skeletons, modeling, the painting of models, etc. In the course of a few years the accommodations which it furnished were greatly outgrown, and certain divisions of the work were transferred elsewhere. At the present time only the upper story is occupied for any of these purposes, and principally by the bird taxidermists. In 1881 the department of photography was removed to the Museum building, and the old rooms were allotted to the use of the photographers of the U. S. Geological Survey and the Bureau of American Ethnology, who remained there until 1884.

ARMORY BUILDING.

This building, assigned in 1877 to the purposes of the National Museum and now occupied as the headquarters of the U. S. Fish Commission, is located at the southern end of that part of the Mall lying between Sixth and Seventh streets. It was erected under an appropriation of $30,000, granted in the civil and diplomatic act for 1856, for the use of the local volunteers and militia and as a place of deposit for the military trophies of the Revolutionary and other wars, and for newly invented and model arms for the military service. It is a rectangular brick structure, with many large windows, measuring about 102 feet long, 58 feet wide, and 46 feet high to the gable. It has four stories, including an attic, which afford a combined floor space of over 20,000 square feet. The building remained dedicated to its original uses until after the close of the civil war, when, the militia of the District not being organized, it was left unoccupied.

The use of this building was granted to the Smithsonian Institution, in order to provide for the temporary storage of the large collections

which were expected to be received from the Centennial Exhibition at Philadelphia, by the following provision in the sundry civil act for 1877:

For repairing and fitting-up the so-called Armory building, on the Mall between Sixth and Seventh streets, and to enable the Smithsonian Institution to store therein and to take care of specimens of the extensive series of the ores of the precious metals, marbles, building stones, coals, and numerous objects of natural history now on exhibition in Philadelphia, including other objects of practical and economical value presented by various foreign governments to the National Museum, $4,500: *Provided*, That the said sum shall be expended under the direction of the Secretary of the Smithsonian Institution.

The collections, when brought to Washington from Philadelphia and stored in this building in their original packing cases, together with other collections from national surveys, filled it completely from the ground floor to the attic. The sundry civil act for 1878 provided for the completion of the interior arrangements and for maintenance in the following terms:

For fitting up the Armory building for storage of articles belonging to the United States, including those transferred from the international exhibition and expense of watching the same, $2,500.

For 1879 and 1880, the same sum was granted "for expense of watching and storage of articles," etc. An identical amount was appropriated for 1881, in which year the National Museum building was completed, and the following clause added: "and for transfer to the new National Museum."

Some of these collections, with others from the Geological Survey and the Bureau of Ethnology, and several workshops were retained, however, at the Armory building for a number of years longer, when certain quarters, including the main floor, were appropriated to the use of the U. S. Fish Commission, of which the Commissioner, Spencer F. Baird, was also keeper of the Museum. The following was the wording of the act for 1882:

For expense of watching, care, and storage of duplicate Government collections and of property of the United States Fish Commission, $2,500.

The text of the sundry civil items for 1883, 1884, and 1885, was identical, except for the insertion of the word "ground" in two instances and its omission in the others, and was as follows:

For care of the Armory building (and grounds) and expense of watching, preservation, and storage of the duplicate collections of the Government and of the property of the United States Fish Commission contained therein, including salaries or compensation of all necessary employees, $2,500.

In the corresponding bill for 1886, "the property of the National Museum" was substituted for "the duplicate collections of the Government."

During the succeeding three years no appropriations were made

directly for the Armory building. It became more extensively used by the Fish Commission, the Museum retaining only a few workshops and some storage quarters on the third floor. The expenses of maintenance and repair were paid by the Commission. In 1888 the newly appointed Fish Commissioner requested that the entire building be turned over to the Fish Commission for office and hatchery purposes. Opposition arising, however, the matter was settled for the time by the following item in the sundry civil act for 1889:

That the building known as the Armory building, Washington, D. C., shall be occupied as at present, jointly by the United States Commission of Fish and Fisheries and the National Museum.

The act for 1890, however, which is as follows, extended the privileges of the Fish Commission:

Fish Commission: For altering and fitting up the interior of the Armory building, on the Mall, city of Washington, now occupied as a hatching station, for the accommodation of the offices of the United States Fish Commission, and for general repairs to said building, including the heating apparatus, and for repairing and extending the outbuildings, $7,000, or so much thereof as may be necessary, the same to be immediately available and to be expended under the direction of the Architect of the Capitol; and for the purpose above named the Secretary of the Smithsonian Institution is hereby required to move from the second and third stories of this building all properties, except such as are connected with the workshops hereinafter named, under his control; and the workshops now in the second story of said building shall be transferred to and provided for in the third story thereof. And the Architect of the Capitol is hereby directed to examine and make report to Congress at its next regular session as to the practicability and cost of constructing a basement story under the National Museum building.

In his report upon the National Museum for 1890, Doctor Goode states that—

In the Armory building there are at the present time several hundreds of boxes containing valuable material which has never been unpacked, since there is no space available for the display of the specimens. Many of the boxes contain collections which were brought to the Museum through the medium of special acts of Congress.

Realizing, however, the inconvenience to the Fish Commission of retaining these undesirable features in the midst of the office quarters then in course of construction, a compromise was effected whereby the balance of the material in storage was transferred to a large adjacent shed erected by the Commission and the workshops to a location near the Museum. Some parts of these sheds are still used for the same purpose.

THE MUSEUM BUILDING.

HISTORICAL ACCOUNT.

At the beginning of 1877 the Board of Regents made its first request to Congress for means to erect a museum building supplemental to the Smithsonian building, which for over twenty years had housed the

NORTH FRONT, NATIONAL MUSEUM BUILDING.

collections of the Government in conformity with the act establishing the Institution. By this time all of the available space in the Smithsonian building was overcrowded with specimens, and the need of additional, spacious quarters had suddenly arisen, mainly through the acquisition of exceedingly large collections of great value, donated to the United States by foreign governments and other exhibitors at the Philadelphia Centennial Exhibition of 1876. At their meeting of January 24, 1877, the question was under discussion by the Regents, when, on motion of Doctor Parker, the following preamble and resolution were adopted, and the Secretary was instructed to transmit them to Congress:

Whereas Congress, in the organization of the Smithsonian Institution, directed that it should make provision on a liberal scale for a museum to contain all the objects of natural history and of curious and foreign research, then belonging to or hereafter to belong to the United States Government; and

Whereas, in accordance with this direction, the Institution has developed and for many years principally supported this National Museum, the collection being the property of the Government, while the building was erected for their accommodation, at a cost of $500,000, out of the income of the Smithson fund; and

Whereas, on account of the appropriations of Congress for a national exhibit at the Centennial, and the liberal donations which have been made by several States of the Union, by individuals, and especially by foreign governments, the National Museum has suddenly increased to fourfold its previous dimensions and far beyond the capacity of the Smithsonian building to contain it: Therefore,

Resolved, That Congress be respectfully requested to provide accommodations for these additional collections by the erection of a suitable building in connection with the present Smithsonian edifice.

This resolution was presented to the Senate on January 26, 1877, and to the House of Representatives on February 2 of the same year, being referred in the former body to the Committee on Public Buildings and Grounds and in the latter to the Committee on Appropriations.

Under date of February 5, 1877, the Regents also transmitted to Congress a memorial on the same subject, which, besides defining the legal objects of the Museum of the Smithsonian Institution and the origin and extent of its collections, contained the following paragraphs, equally pertinent to the needs for added space:

By an act bearing date July 31, 1876, additional duties were laid upon the Smithsonian Institution as custodian, and $4,500 were appropriated "for repairing and fitting up the so-called Armory building, on the Mall between Sixth and Seventh streets, and to enable the Smithsonian Institution to store therein and to take care of specimens of the extensive series of the ores of the precious metals, marbles, building stones, coals, and numerous objects of natural history now on exhibition in Philadelphia, including other objects of practical and economical value presented by various foreign governments to the National Museum.

As a fruit of this act of the General Government, the Smithsonian Institution finds itself the custodian of enormous collections that had been displayed at the Centennial Exposition and on the closing of that exhibition had been presented to the United States. These donations are made by individuals among our own citizens,

by foreign exhibitors, and by several of the States of the Union, and there is scarcely a power in the civilized world in any region of the globe which has not taken part in these contributions, and some of them with the largest generosity. Men of science, most competent to pass judgment, pronounce them to be of immense value and are of opinion that, including the gifts from States of the Union and the exhibits of the United States, they could not have been brought together by purchase for less than a million of dollars.

* * * * * * *

Their adequate exhibition requires an additional building which shall afford at least four times the space furnished by the present edifice of the Institution.

The Government of the United States is now in possession of the materials of a museum exhibiting the natural products of our own country, associated with those of foreign nations, which would rival in magnitude, value, and interest the most celebrated museums of the Old World.

The immediate practical question is, Shall these precious materials be for the most part packed away in boxes, liable to injury and decay, or shall they be exhibited?

It was the act of Congress which ordered the acceptance in trust of these noble gifts to the United States. The receiving of them implies that they will be taken care of in a manner corresponding to the just expectations of those who gave them; and one of the prevailing motives of the donors was that the productions of their several lands might continue to be exhibited. The intrinsic value of the donations is, moreover, enhanced by the circumstances under which they were made. They came to us in the one hundredth year of our life as a nation, in token of the desire of the governments of the world to manifest their interest in our destiny. This consideration becomes the more pleasing when we bring to mind that these gifts have been received not exclusively from the great nations of Europe from which we are sprung, or from the empire and republics on our own continent beyond the line, but that they come to us from the oldest abode of civilization on the Nile, from the time-honored empires and kingdoms of the remotest eastern Asia, and from the principal states which are rising into intellectual and industrial and political greatness in the farthest isles and continent; from states which are younger than ourselves and bring their contributions as a congratulatory offering to their elder brother.

We have deemed it our duty to lay these facts and reflections before both Houses of Congress and to represent to them that if they, in their wisdom, think that the unequaled accumulation of natural specimens and works interesting to science, the evidence of the good will to us that exists among men, should be placed where it can be seen and studied by the people of our own land and by travelers from abroad, it will be necessary to make an appropriation for the immediate erection of a spacious building. Careful inquiries have been instituted to ascertain the smallest sum which would be adequate to that purpose, and the plan of a convenient structure has been made by General Meigs, the Quartermaster-General, U. S. Army. We beg leave further to represent that to accomplish the purpose there would be need of an appropriation of $250,000. This amount is required not as a first installment, to be followed by others, but as sufficient entirely to complete the edifice.

Should this appropriation be made at an early day, the building could be ready for the reception of articles before the next session of Congress.

This memorial was referred in both Houses to the Committees on Public Buildings and Grounds and met with general favor. A bill meeting the requirements was passed by the Senate on February 22, 1877, but a corresponding bill offered in the House on March 2 was defeated by objection, possibly because of the lateness of the session, less than two days remaining before the close of Congress. The debates were brief but interesting.

NORTH FRONT, NATIONAL MUSEUM BUILDING.

Senator Morrill, on February 6, 1877, remarked:

As I have stated in years past, it has seemed to be a necessity that we should provide for a national museum. It has been the opinion of the Committee on Public Buildings and Grounds on the part of the Senate, I believe unanimously, for some years that we ought to take all of the squares next east of the public grounds, throughout the length and breadth of the north and south range of one square, taking one square in depth and the whole length, for the purpose of a national museum and Congressional Library, and evidently this matter should be provided for at once. * * * There are, as I am informed, at least fifty carloads of articles that have been given to us by foreign governments. Thirty-two or thirty-three out of the forty nationalities abroad have given us their entire exhibits at the Centennial Exhibition. Their money value is scarcely computable, but if it were to be computed it exceeds our own, as large as our exhibits were there and as creditable to the country. Our own, I believe, in money value, have been computed at $400,000. These foreign exhibits are computed, at least in money value, at the sum of $600,000, but in historical and scientific interest they perhaps surpass anything that has been assembled in any national museum on the globe.

Senator J. W. Stevenson, on the same day, made the following statement:

It is known to the Senate that the Smithsonian Institution was represented at the late Centennial Exhibition at Philadelphia. At the close of that exposition a number of the foreign powers there represented and who contributed to that grand display, at its close generously donated to the Smithsonian Institution most of their articles and products there exhibited. * * * The motive which prompted these donations to the Smithsonian Institution was unquestionably one of amity and respect entertained by the foreign powers donating them for the Government of the United States. But unquestionably these donors expected that this Government would, through the agency of the Smithsonian Institution, keep these articles thus donated on public exhibition, and in this way the respective products of each country would become known to the people of our entire country.

The articles donated are valuable, rare, varied, and occupy much space. * * * The Smithsonian Institution has no building in which they can be either exhibited or safely preserved. They must remain, therefore, in boxes, subject to injury and to decay, unless Congress shall take some immediate action toward the erection of a building in all respects suitable for their exhibition and preservation. The capacity of such a building is estimated by competent architects to be four times as large as the Smithsonian building. A plan of such a structure has been already drawn by General Meigs. * * *

Professor Henry assures me that with the erection of the contemplated building on the plan of General Meigs, with the articles now on exhibition in the Smithsonian Institution with those just donated, we shall have the nucleus of a national museum which, in a few years, will equal any in the world.

In presenting the memorial to the House on February 7, 1877, Representative Hiester Clymer said, among other things:

It may not be disputed that the acceptance of them [the collections from Philadelphia] by the Government imposes an obligation that they shall be preserved and exhibited for the gratification and instruction of the people. Their preservation and exhibition must be confided to the National Museum, of which, by law, the Regents of the Smithsonian have the custody. They have presented for our consideration the necessity for erecting a suitable building for the purposes I have indicated, giving an estimate of its probable cost.

The bill which passed the Senate as an item in the sundry civil bill, but failed of action in the House, in this the second session of the Forty-fourth Congress was as follows:

For a fireproof building for the use of the National Museum, 300 feet square, to be erected under the direction and supervision of the Regents of the Smithsonian Institution, in accordance with the plan of Maj. Gen. M. C. Meigs, now on file with the Joint Committee of Public Buildings and Grounds, on the southwest corner of the grounds of the Smithsonian Institution, the sum of $250,000 is hereby appropriated out of any money in the Treasury not otherwise appropriated; said building to be placed west of the Smithsonian Institution, leaving a roadway between it and the latter of not less than 30 feet, with its north front on a line parallel with the north face of the buildings of the Agricultural Department and of the Smithsonian Institution; and all expenditures for the purposes herein mentioned, not including anything for architectural plans, shall be audited by the proper officers of the Treasury Department.

The necessity for a new Museum building was brought to the attention of the President of the United States through the following communication, dated October 8, 1877:

SIR: I have the honor, in behalf of the Board of Regents of the Smithsonian Institution, to invite your attention to the propriety of recommending to Congress the memorial of the Board of Regents (a copy of which is herewith inclosed), asking that an appropriation be made for a building to accommodate the valuable collections presented to the United States through this Institution at the late international exhibition in Philadelphia.

As explanatory of this request it may be proper to state that the Smithsonian Institution was authorized by Congress to receive and take charge of these collections, and that they were presented with the expectation on the part of the donors that suitable provision would be made for their display at the seat of government. They consist of full series of articles illustrative of the economic products, the natural history, and in many cases the manners, customs, and arts of the foreign countries represented at the Centennial Exhibition, and are of great importance to the advancement of science, education, and manufacture. Besides these are the objects collected by the Smithsonian Institution and U. S. Fish Commission of the animal, mineral, and fishery resources of the United States, also of public interest.

These articles now constitute, by law, a part of the National Museum, which has been placed by Congress in charge of the Smithsonian Institution. This Museum has hitherto been accommodated in the building erected for the purpose at the expense of the Smithson fund, in accordance with the direction of Congress. This edifice, however, is filled to overflowing, while there are elsewhere, in storage, from the donations previously mentioned, collections of greater magnitude than those in the Smithsonian building.

It is evident that an appropriation for an additional building can not justly be taken from the Smithson fund, and therefore the Board of Regents have made the application mentioned in their memorial. This memorial was presented to Congress at its last session, when the appropriation asked for was granted by the Senate unanimously, and when, in all probability, it would have been granted by the House could the proposition have been brought to the consideration of that body.

I am, with sentiments of high esteem, your obedient servant,

JOSEPH HENRY,
Secretary Smithsonian Institution.

HON. RUTHERFORD B. HAYES.

ROTUNDA, NATIONAL MUSEUM BUILDING.

In his message to the Forty-fifth Congress, first session, December 3, 1877, the President recommended "that an adequate appropriation be made for the establishment and conduct of a national museum under their [the Regents] supervision."

Acting upon the basis of information supplied during the previous session, the same bill was introduced in the House of Representatives (H. R. 2662) on January 21, 1878, by Senator Casey Young. It was referred to the Committee on Public Buildings and Grounds, which, through Mr. Young, submitted a report (No. 244) upon the measure on February 25, 1878. On March 6 following, the bill was again brought up, referred to the Committee of the Whole and placed on the Calendar, but no further action was taken. A similar bill (S. 1320) was submitted in the Senate by Senator Justin S. Morrill on May 27, 1878, and referred to the Committee on Public Buildings and Grounds.

The report of the House committee (No. 244) briefly sets forth the history and requirements of the Museum and the steps taken to secure the valuable collections exhibited at Philadelphia, and closes as follows:

The collections in the Smithsonian building now open to the public occupy about 30,000 square feet of floor space. It is quite within bounds to estimate that the articles stored away will require for their satisfactory exhibition between three and four times that area, even allowing for a great reduction of the objects by the elimination and distribution of the duplicate specimens. There is no provision whatever at present for the display of these articles, and unless Congress furnishes the means this magnificent property of the people will go to decay and destruction in the course of time, the animal products being destroyed rapidly by insects and many objects of a mineral or metallurgical character by rust.

As every day of delay in arranging and exhibiting this collection is accompanied with the question of erecting a suitable building for its accommodation and has occupied the attention of the Smithsonian Institution, a plan has been devised which, it is believed, will furnish the facilities required in the shortest possible interval of time and at the minimum of expense.

To erect an edifice of the necessary magnitude, in the style of architecture heretofore adopted by the Government for its use in Washington, would involve an expenditure of many millions of dollars, and it could not be completed and available for occupation in a shorter period than from five to eight years. Nevertheless, on a simple plan originally suggested by General Meigs, a building somewhat similar in character to those erected for the National Exposition, 300 feet square, or having an area of 90,000 square feet—something over two acres—perfectly fireproof, amply lighted, and properly adapted for all its objects, can be constructed for about $250,000, and can be ready for occupation within ten months, or at most a year, from the time of its commencement.

By the plan contemplated everything would be on one floor, without any stairways or second story, no cellar or fireproof floor being required. The single floor of the building to be of concrete, and thus water and vermin proof; the walls and other portions of the building of brick, and the beams, rafters, and framework of the roof of iron, without a particle of wood.

It is therefore much to be desired that the means be furnished at an early day for the construction of this building, so that the rich material now belonging to the United States Government can be utilized.

It is believed that when properly arranged the National Museum of the United States will take rank as one of the great industrial and economical displays of the natural resources of the globe. The accommodation will then be afforded for the exhibition of the mineral wealth of every State and Territory, and the display of samples of every new mine, with all the appliances for rendering the study of the whole interesting and profitable. The coals, the marbles, and other ornamental minerals will be exhibited systematically; the useful and ornamental products and derivatives of the animal kingdom will be shown—not only such as relate to the United States, but with illustrations of the whole subject in other parts of the world—which can not fail to suggest new and important applications in this country. Illustrations of the food and other fishes of this and other countries, the best methods of securing them and of preparing them for the requirements of mankind, and the varied productions of the aboriginal races of North America can also be displayed on a proper scale.

During the second session of the same Congress the bill for a new building was again brought up in both Houses. Brief remarks were made in the Senate and the bill slightly amended in regard to the wording relative to location. It was passed as an item in the sundry civil act for 1880 in the following terms:

For a fireproof building for the use of the National Museum, 300 feet square, to be erected under the direction and supervision of the Regents of the Smithsonian Institution, in accordance with the plans now on file with the Joint Committee of Public Buildings and Grounds, on the southeastern portion of the grounds of the Smithsonian Institution, $250,000: said building to be placed east of the Smithsonian Institution, leaving a roadway between it and the latter of not less than 50 feet, with its north front on a line with the south face of the buildings of the Agricultural Department and of the Smithsonian Institution; and all expenditures for the purposes herein mentioned, not including anything for architectural plans, shall be audited by the proper officers of the Treasury Department.

The following extracts from the report of the building commission, submitted January 19, 1880, give a summary of the building operations for 1879:

Anticipating the early action of Congress in the premises, the Board of Regents, on the 17th of January, 1879, adopted the following resolution:

"*Resolved*, That the executive committee of the Board, or a majority thereof, and the Secretary be, and they are hereby, authorized and empowered to act for and in the name of the Board of Regents in carrying into effect the provisions of any act of Congress that may be passed providing for the erection of a building for the National Museum."

Accordingly, on the 7th of March, 1879, Hon. Peter Parker and Gen. W. T. Sherman, the resident members of the executive committee, with the Secretary, met in the office of the Institution, and after organizing under the title of "National Museum Building Commission," of which Gen. W. T. Sherman was chosen chairman, proceeded to adopt such measures as in their opinion appeared best calculated to realize, with the least possible delay, the intention of Congress.

The committee at the outset invited Gen. M. C. Meigs, Quartermaster-General U. S. Army, to act in the capacity of consulting engineer to the commission, and also selected Messrs. Cluss & Schulze, whose plans for the new building were those approved by Congress, as superintending architects. Mr. Daniel Leech was appointed secretary of the commission.

NORTH HALL, NATIONAL MUSEUM BUILDING. HALL OF AMERICAN HISTORY.

To remove as far as possible any doubt as to the sufficiency of the appropriation for a building in accordance with the plans approved by Congress, Mr. Edward Clark, Architect of the Capitol, and General Meigs, after carefully considering the provisional estimates of the architects, informed the commission that in their opinion the amount was sufficient for the purpose.

To obtain a clear understanding of the intent of Congress in making the appropriation, as well as to ascertain how far, if desirable, the commission might be authorized to depart from the plans before the Committees of Public Buildings and Grounds when the act was passed, the chairmen of the respective committees (Hon. H. L. Dawes and Hon. Philip Cook) were consulted; whereupon these gentlemen officially informed the commission "that, provided the general design be retained, it was not their intention, nor that of their committees, to confine the Board of Regents of the Smithsonian Institution to the minor details of the aforesaid plans, but to authorize any modifications that might appear to them desirable in the interest of economy or for the better adaptation of the building to its object."

On ascertaining that the appropriation could be made immediately available under the clause directing that the accounts should be audited by the proper officers of the Treasury Department, the Secretary of the Treasury was, on the 27th of March, requested to designate some one of his force to act as disbursing officer. Accordingly Maj. T. J. Hobbs, disbursing clerk of the Department, was selected, and payments were authorized to be made by him on vouchers approved by the Secretary of the Smithsonian Institution as provided for in the following resolution:

"*Resolved*, That the commission appointed by the Board of Regents of the Smithsonian Institution to superintend the construction of a new fireproof building for the National Museum hereby authorize Prof. S. F. Baird, Secretary of the Institution, to act as their agent to approve for payment by Thomas J. Hobbs, all bills for services and supplies from such funds as are placed in the hands of the latter by said commission for such purposes, and the Secretary of the Treasury is hereby respectfully requested to instruct Thomas J. Hobbs, disbursing agent, to pay any bills when thus certified and found to be otherwise technically correct."

Having thus prepared the way to a commencement of active operations, specifications were at once prepared and proposals invited for carrying on the work. Ground was broken on the 17th of April, 1879.

The concrete foundations were begun on the 29th of April, and the brickwork of the walls on the 21st of May, the main walls being completed on the 1st day of November.

In consequence of the low prices of the more important building materials, very favorable contracts were made, especially for the brick required and for the ironwork, since the price of iron advanced very materially within a few months from the date referred to. The same is true with regard to glass, bricks, and in fact almost all building materials.

* * * * * * *

The estimate of $250,000 for the construction of a museum building did not include the heating apparatus. As the work progressed, however, it became evident that all the underground piping for water, gas, and steam, at least, could be obtained from the fund.

In anticipation of an appropriation for the purpose, it was deemed best to obtain provisional bids for a steam-heating apparatus. Accordingly proposals were invited: First, for the underground pipes; second, for the boilers; third, for the radiators. The aggregate of the estimates for the three items varied from $13,940 to $55,680.

The lowest bid was rejected on account of inadequacy of the supply of heat. The next to the lowest was that of Messrs. Baker, Smith & Co., for $19,768, which was accepted, and a contract made for the underground pipes for $5,770.

An appropriation of $30,000 has been asked of Congress for the completion of the

heating apparatus throughout, for the gas and water fixtures and the electric apparatus required for clocks in the building, for signals, alarms, etc.

Before the building can be occupied it must of course be furnished and fitted up with cases, of which, as might be expected, a large provision is required. According to a calculation, the cases that will be needed, if placed end to end, will extend to a distance of more than 8,000 feet, with a total of shelving surface of about 75,000 square feet. The frontage of the cases will be over 14,000 feet, so that, allowing for the crossing from one case to another, a journey of at least 3 miles will be required even to take a cursory glance at all the objects in the collection.

The question of the best material for the cases has not been definitely settled, the choice lying between iron and hard wood. In order to assist in determining this question satisfactorily, arrangements have been made to obtain working plans of the cases used not only in a number of museums in the United States, especially in Cambridge, Boston, and New York, but also in Europe. The new building now being erected for the collections of the British Museum is one where it is supposed the best experience has been made use of in the plans of the cases, and arrangements have been made to obtain copies of the same. The new iron cases of the national museum at Dresden are also under investigation. Iron is more expensive than wood, but involves less danger of decay, and there is also an especial advantage in the fact that the material may be so much thinner as to increase the interior space, while the objects in the cases are less obscured. Of course it must not be forgotten that the National Museum is expected to discharge its functions for an indefinite period of years.

The provision of Congress directed that the new building should be placed to the east of the present Smithsonian edifice, at least 50 feet from its southeastern corner. The question was considered of having the interval greater than this minimum, but it was found that this would involve the extension of the building beyond the boundary of the Smithsonian reservation and carry it to the unassigned portion of the square. Although there was nothing in the act to prevent this encroachment, yet in view of the possibility that the southeastern portion of the public land between Seventh and Twelfth streets would be required for some other purposes, perhaps for a Congressional Library, it was thought best to encroach upon it as little as possible.

In addition to its answering the purpose for which it was primarily intended, it is confidently believed that the new National Museum building will exercise an important function in serving as a model for similar establishments elsewhere.

Of course in a city where the cost of land is a matter of important consideration, the one-story plan can not always be carried out, the usual position of story above story being necessary to secure the desired space. Most colleges and universities, however, have ample grounds belonging to them, the occupation of which by large buildings is allowable. Under such circumstances the same amount of fireproof space can be had for from two-thirds to one-half the usual cost.

The office of member of the building commission has been by no means a sinecure, weekly meetings having been held, with scarcely an interruption, from the first organization, as shown by the full reports kept of the proceedings. General Meigs, as consulting engineer, until his recent departure on a tour of duty, was present at every meeting and continually aided the commission by his advice, rendered so valuable by his long familiarity with building operations on a large scale and with the whole question of the proper construction of contracts. He visited the grounds nearly every day and closely inspected the progress of the work. To him are also due valuable suggestions on the methods of covering the roofs and on other details.

Two subsequent reports were made by the building commission—one covering the year 1880, the other 1881. In these the progress of the work and the dates of completion of important parts of the building

SOUTH HALL, NATIONAL MUSEUM BUILDING. EXHIBITION OF MAMMALS.

were noted. The roofs were finished in April, 1880, and the plastering by the latter part of July. In the interest of economy in heating all outside windows were furnished with two panes of glass. Wooden floors were laid in 1880 in all the halls, except the four courts, the four main halls or naves, and the rotunda. Congress was asked for an appropriation to defray the expense of a marble or tile floor for the naves and rotunda, and $26,000 was allowed for this purpose, becoming available in the summer of 1881. The rotunda was then supplied with a floor of encaustic tiles and the main halls with floors of marble tiles. The approaches to the building were constructed out of the original appropriation.

The final report of the commission, dated January 2, 1882, closes as follows:

In closing this its third annual report, the National Museum building commission congratulates the Regents that the new building for the National Museum is so far completed as to be ready for occupancy, and in now asking the Board to take charge of the edifice the commission begs to refer to the important fact that, while a building is presented equal in every respect to what was anticipated in case provision should be made for additional quarters for the national collections intrusted to the care of the Smithsonian Institution, instead of incurring a deficiency, the fund has been so managed as to have to its credit at the present moment an available balance of some thousands of dollars.

Having fulfilled the duties with which it was charged by your resolution of January 17, 1879, the commission would respectfully ask to be discharged and to be authorized to turn over to the Secretary of the Smithsonian Institution the building itself, and to the United States Treasury whatever balance of money may remain after liquidating the last liability on account of the construction of the edifice.

The appropriations which had been made for the building were as follows:

Building	$250,000
Steam heating apparatus	25,000
Water, gas, and electric apparatus	12,500
Marble and tile flooring	26,000
Special sewer connection	1,900
Total	315,400

The subjects intended to be represented in the new building were stated by Secretary Baird, in his report for 1879, to be as follows:

The period of complete installation of collections on hand and the opening of the building to the public will depend upon the amount of the appropriation and the rapidity with which the contractors may complete their work. The new building will be devoted more particularly to industrial exhibits, intended to show the animal and mineral resources of the United States and their practical applications to the wants or luxuries of man. The department of anthropology will also be largely represented. How far natural history can find a place in the building will depend upon the space required for the collections mentioned. It is confidently expected that this building when finished will be one of the most attractive objects of the kind extant and but little inferior to the celebrated museums of foreign countries.

In his report for 1880 he says:

I now have the pleasure of stating that the work has been in the greater part completed during the year 1880 and that a portion of the building is already occupied for its legitimate objects.

The details of progress and completion will be given in full in the report of the building committee and of the architect, to which I would refer. It will be sufficient to say here that the work has all been done within the estimates and that it promises to be even more suitable to its purpose than was anticipated. All the requirements in regard to light and heat are fully met, and in this respect and in that of its slight cost in proportion to the space obtained, the building is believed to have no parallel in the country. Including the building proper, the steam heating apparatus, the gas and water fixtures, and all their accessories, the cost has amounted to less than $3 per square foot of ground floor and to about 6 cents per cubic foot of entire capacity.

The first use of the building was for the inaugural reception to President Garfield on March 4, 1881, which was granted in accordance with the following resolution of the Regents at a meeting held on December 8, 1880:

Whereas the new Museum building is unfinished and not ready for occupancy of the Government collections, and whereas such a contingency will not again occur, and that no precedent is to be given for the use of the building for other purposes:

Resolved, That the use of the new National Museum building be granted for the inaugural reception of the President of the United States on the 4th of March, 1881, and that the Secretary of the Smithsonian Institution be authorized to make all necessary arrangements for this purpose.

In 1881 Professor Baird stated that the building might then be considered as completed and ready for its final occupation by the various departments which have been assigned to it. Some small additions and alterations were still required to be made, but they did not interfere with the general use of the structure. In the beginning certain office and laboratory quarters were granted to the United States Geological Survey, especially in the northeast pavilion, and they continued to be so used for several years.

It was soon recognized that the building was too small to provide all the necessary accommodations, even though the Museum continued in possession of the same space in the Smithsonian building as before, and the inconvenience from this source increased rapidly with time. It thus also resulted that not all of the halls could be used for exhibition purposes as intended, and until lately some of them have always been closed to the public, that they might be employed for storage, for unpacking, or for workrooms.

There have been from the beginning many changes in the assignment of space to the different departments, but transfers from one building to the other have been few since the occupation of the newer structure. The clearing up of the exhibition halls, which were never in as good condition as now, has been mainly accomplished by the heroic method of sending large quantities of specimens to outside stor-

WEST HALL, NATIONAL MUSEUM BUILDING, EXHIBITION OF ETHNOLOGY.

age and by the fitting up of a few outside workrooms. Another factor in this direction has been the construction of a number of galleries, as explained below.

Secretary Baird says, in his report for 1882, that—

> The Museum building was received from the hands of the architects in so complete a state that but little remained to be done beyond the tinting of a portion of the walls and the filling up of some of the alcoves with canvas frames, etc. There is yet much to be done, however, in the construction of the necessary cases for the accommodation of collections.

The building of cases has, in fact, never ceased, for, while the more urgent needs were early supplied, cases of one description or another have been added from year to year. Many cases used at national expositions have been returned in so defaced a condition that it has been necessary to reject or rebuild them, and cases of new and improved patterns have replaced many of the older ones.

In 1883 Professor Baird remarks that the "building continues to preserve the reputation it has acquired as representing the maximum of convenience and adaptation to its purposes with the minimum of original cost and expense for repairs;" and in 1885 he states that the "building is in excellent condition and has required comparatively little in the way of repairs."

After not many years, however, certain weak points began to develop, and these have been the cause of much concern and have necessitated almost continuous repairs, though seldom at great expense. The walls are essentially substantial, but the roof was constructed at too little cost and is far below the standard of the brickwork. Its weakness and incompleteness is evident both in the supporting framework and in the covering. The framework has given way in places under heavy falls of snow, and the covering has developed numerous leaks, most commonly about the breaks in the roof, but elsewhere as well, and the constant attention of one mechanic has been insufficient to keep these leaks under control. While it is intended soon to renew the worst of this covering, it is now quite certain that a considerable part of the roof must be wholly rebuilt before many years.

The leaks from the roof have so constantly defaced the inside walls of the naves and courts that only recently has it been deemed advisable to repaint them, a work which was mainly accomplished during 1902 and 1903, and which has greatly improved the appearance of the exhibition halls.

The principal other changes in the interior of the building, in the nature of permanent improvements, have been the replacement of the wooden floors with cement, the building of galleries in nearly all the halls, and the addition of some skylights. The first has improved both the conditions and the appearance of the halls, and as the floors were without proper foundation the former wooden covering was

inadequate to keep out the moisture or impurities from the soil. The galleries have materially increased the amount of space, and the new skylights were rendered necessary by their introduction. These features may be briefly referred to as follows:

In some of the preliminary drawings for the museum building a tier of galleries is shown in each of the exhibition halls, but in the plans as finally adopted and presented to Congress these features were not represented. The height of the several halls, however, was made sufficient to permit of their introduction at any time. In view of the failure to secure early action by Congress toward the erection of a third building, it was decided to urge the construction of these galleries, in order that some additional space might be acquired. The entire sum needed for such a purpose was not requested at once, but the estimates for 1893, 1894, 1895, and 1896 each contained an item of $8,000. These failed to receive favorable consideration by Congress, but the amount named was appropriated in the sundry civil act for 1897, and other appropriations followed, namely, $8,000 in 1898, $10,000 in 1899, and $5,000 in 1902, making a total of $31,000 for this purpose. From this amount galleries were erected in all the halls, courts, and ranges, except the north hall and the northeast and east-north ranges. In the southeast range the galleries have been extended so as to form a complete second floor. Though intended primarily for exhibition purposes, it has been necessary to assign certain of the galleries to the storage of reserve collections and as workrooms, as elsewhere explained.

The only substantial floors laid in the beginning were those in the rotunda and the four main halls, as already described, the former being of encaustic tiles, the latter of marble squares. The remaining floors in all parts of the main building were of wood. The latter were allowed to remain until thoroughly worn out, being gradually replaced by more durable material. These changes began in 1891 and were not completed until 1900. The first of the new floors, and, in fact, the greater number, were constructed of cement, granito, and granolithic; the last four were made of terrazzo pavement, small irregular pieces of marble, laid in cement, and are the most satisfactory, in appearance at least.

The other work of repair and alteration, conducted at the expense of the general appropriation for this purpose, need not be analyzed here. It has produced, as a whole, many marked improvements, though for the most part it has been directed toward maintaining the building in as fair a condition as the funds have permitted.

NATIONAL MUSEUM BUILDING.

DESCRIPTION.

In describing the present Museum building,[a] the architects, Messrs. Cluss & Schulze, spoke of it as follows:

A modernized Romanesque style of architecture was adopted for the new building in order to keep up a relationship with the Smithsonian building, which is designed in Norman, a variety of this style. To modernize this style was found necessary on account of the different building material, and to do justice to the purposes of the building with its modern demands of perfect safety and elegance of construction, of greatest possible available floor space, of easy communications, efficient drainage, a well-calculated and pleasing admission of light, free circulation of air, and all other hygienic dicta.

The external architecture is based upon the general arrangement of the interior, and shows plainly the prominence of the four naves and the careful management of the light for the central portion of the building. The main entrances are in the centers of each façade between two lofty towers of 86 feet height, which act as buttresses for the naves. Between the towers, and receding from the doorways, there are large arched windows set with ornamented glass, and above those the gables of the naves are formed; they contain inscription plates, and are crowned by allegorical groups of statuary. The group over the northern gable, designed by C. Buberl, of New York, already in position, introduces Columbia as the protectress of science and industry. * * *

On the whole, the one-story plan which has prevailed among experts ever since he Paris exhibition of 1867 has been adopted. But by the introduction of upper stories on those outlying sections reserved for offices, ample office room has been secured without encroaching materially upon the floor space within the square of 300 feet to which the building was primarily limited.

Whatever may be the style of architecture represented, the exterior of the building can not lay claim to dignity of appearance or to any degree of esthetic merit, although by a symmetrical arrangement of towers and pavilions some relief is given to the low outer walls, and, viewed a short distance off, the tops of the former mingle with the roofs and lantern skylights to produce a not unpicturesque, though crude, effect. The walls are of brick, the roofs principally of iron and slate. The former were well constructed, and should long remain in good condition, but the latter were early found to be, in greater part, unsuitable and insecure. These defects were largely due to the smallness of the appropriation, only $250,000, which did not permit of the best class of workmanship and material, and the failure to produce a better architectural effect can probably also be accounted for in the same way.

The interior is plain, and its walls are frequently defaced through the imperfections of the roofs, but the many criticisms which, from the beginning, have been directed against the arrangement of the building are entirely unwarranted. For the purpose for which it was erected, the exhibition of specimens, it probably has no superior

[a] Annual Report of the Smithsonian Institution for 1879, pp. 130, 131.

in this country and few, if any, abroad. The critics have simply confounded cheapness and crudeness with inadaptation to purpose. It is a square building of a single story, consisting of four large naves and a central rotunda in the shape of a Greek cross, with ranges and covered courts filling in the corners, so as to produce a solid or continuous structure every part of which, under the original plan, was well lighted. The ranges have large windows, and the naves and courts both skylights and clerestory windows. It is the plan so often adopted for exposition buildings, and also at times for permanent structures, and is especially convenient to the visitor, in that he has no stairs to climb. There has at no time in the past been any difficulty in so installing the display collections that they could be distinctly seen and the labels read. Within a few years, however, galleries have been built in nearly all the halls, as it was necessary to increase the amount of space. The height of the halls has permitted this to be done without injury to the general effect, but to some extent the lighting has been interfered with, though not so much but that it can be remedied.

This building was planned, as above stated, essentially for exhibition purposes. The space available for laboratories and storage quarters, however, is wholly inadequate, though convenient and well lighted. This may be considered as one of the main defects of the interior, as it is the one most noticeable to the specialist who wants working room, and seldom refers to the exhibition series. A remedy for this condition, recommended and urged upon Congress by Professor Baird, was the erection of a smaller fireproof building nearby, entirely for laboratory and storage needs, and especially for the safeguarding of the alcoholic collections. His ideas were never carried out, but it is hoped that in the new building all of these requirements will be provided.

The building has, moreover, served an excellent purpose as an object lesson, since the experience gained in its construction and furnishing, and in the installation of its collections, has been invaluable in the preparations for the newer structure. It will undoubtedly continue to be occupied for many years to come, and its complete repair will probably be undertaken as soon as the new building is finished.

The building under description stands on the southeast corner of the reservation granted to the Smithsonian Institution by the fundamental act of 1846, and, in fact, overreaches its eastern boundary to about the extent of the width of Ninth street SW. Its north or front face is about on a line with the south face of the Smithsonian building, from which its nearest corner is distant about 50 feet, while its rear face adjoins the sidewalk on B street south.

The main part of the building is about 300 feet square and one story high throughout, though of very different elevations. In the center

NORTHEAST COURT, NATIONAL MUSEUM BUILDING. EXHIBITION OF GRAPHIC ARTS AND CERAMICS.

of each front, at the sides of the entrance, are two tall towers, and at the corners are large pavilions, all of which project about 12½ feet from the main walls, thus making the extreme linear dimensions of the building about 325 feet. The amount of ground covered is 97,786 square feet, or about 2¼ acres.

The primary feature of the plan consists of four naves or main halls, the largest in the building, which radiate in the form of a Greek cross from a central rotunda to the towers above mentioned. Following the outer walls and extending from the naves to the pavilions are a series of eight ranges, two on each side. This arrangement leaves four courts, inclosed by the naves and ranges, which are roofed over and form parts of the actual building. There are, therefore, 17 halls in the body of the building, all designed for exhibition purposes. These halls are separated by heavy brick walls, having numerous broad arched openings reaching nearly to the ceiling. The lower part of these openings both from the floor and from the galleries are filled in with cases or screens, except where needed as passageways. The main halls open broadly into the rotunda. There is one entrance into each court, and one at each end of the several ranges for the circulation of the public.

The central rotunda attains the greatest height. It is octagonal below, with a maximum diameter of 65 feet, and is surmounted by a 16-sided polygon, 67 feet in diameter, which contains a tier of large windows, and is covered with a slate roof rising to a central lantern. The height is 77 feet on the side walls, and 108 feet to the top of the lantern finial. The four main halls, extending from the inner walls of the towers to the rotunda, are 117 feet long by 65 feet wide, their height being 42 feet to the top of the side walls, and 56 feet to the ridge of the roof. The courts are about 63 feet square and of the same wall height as the main halls. The ranges are all a little less than 50 feet wide. Those on the north and south sides of the building are 89 feet long, and those on the east and west sides 63 feet long, the lesser length of the latter being due to extensions from the adjoining pavilions. They are covered with lean-to roofs, their interior height being 26½ feet at the outer walls and 31 feet at the inner.

The several divisions of the building are clearly indicated on the exterior by the unequal heights of the walls and roofs. A description of these features as seen when approaching the north front will answer for the other sides, as all are essentially alike. In the center of the north front is the main entrance, bordered by a tall, arched framework of Ohio sandstone. Above and back of the entrance are the face and gable end of the north hall, reaching to a height of about 55 feet above the ground, bearing a stone plate with the inscription "National Museum, 1879," and surmounted by an allegorical group of statuary representing Columbia as the protectress of science and industry. At

each side of the entrance is one of the towers above mentioned, about 27 feet square and three stories high, topped by a steep roof, with small dormer windows toward the base. The extreme heights of these towers is 85½ feet to the top of the finial.

Extending on each side from the towers to the corner pavilions are curtain walls, 27½ feet high and 87 feet long, with seven broad, arched windows, 8 feet 10 inches wide and 13 feet 7 inches high, the glass in the latter being arranged in three vertical series. Between the windows are narrow buttresses, uniting above in arches. The pavilions are about 40 feet square and 36½ feet high to the eaves, the roofs being much lower and flatter than on the towers. They are divided into three stories, besides a basement, each lighted by eight large, arched windows, except the upper story, which has three small windows grouped in the center on each side. The top of each pavilion has a large lantern skylight.

From the curtain walls the lean-to metal roof rises over the ranges with moderate slope, and abuts against the higher walls of the courts and main halls, both of which have a row of clerestory windows on each side facing the ranges, those of the main halls extending back only as far as the courts. The courts have a large square lantern, from which the roof descends on all four sides to the level of the gutters on the main halls. The main halls have plain hip roofs about the same height as those of the courts, with elongate lantern skylights in the middle. The dome of the rotunda, as before explained, rises above all other portions of the roof, being the most conspicuous feature of the top of the building. All the roofs are covered with slate except those of the ranges, which are of tin. The slates are nailed to small pieces of wood, fitted into small L-shaped pieces of iron, and the plaster of the ceiling is laid directly upon the rough inner surface so formed. Besides the lanterns before mentioned, a number of small skylights and ventilators have been built over some of the ranges and courts, especially where the recently constructed galleries have interfered with the lighting.

The entire framework, as well as the inner sheathing of the roofs, are exposed to view, this plan having been followed in the interest of economy. The roofs of the main halls, the rotunda, and the courts are supported by iron trusses of the Pratt pattern; those over the ranges by triangular girders of rivited angle iron. In 1894 some of the purlines in the main halls near the rotunda began to buckle and were reenforced with angle iron. By 1900 all of the iron work over the main halls had begun to show signs of weakness, caused by alternate expansion and contraction, thus producing many leaks in the slate covering, and the entire framework was accordingly braced and strengthened by means of angle steel. The woodwork about the lanterns was also replaced by iron, and other improvements were made.

The inner surface of all the roofs was originally covered with a thin coat of plaster. In the ranges the metal top was underlaid by fireproof gratings, to which the plaster was applied. As the keying proved insufficient or the plaster not strong enough, large pieces began to give way at the very beginning, and to eliminate this source of danger all the plaster was removed in the ranges, leaving the gratings uncovered. After being painted, however, the appearance of the ceiling proved not to be out of keeping with its surroundings. In one range the ceiling was at the same time covered with corrugated iron, leaving an air space between it and the tin roof above, and it was thought by the architects that this arrangement would tend to regulate the temperature of the halls. Nothing further, however, has been done in this direction.

Through failure to secure additional space by the erection of a new building, galleries began to be added in the present building in 1896, and their construction was continued from year to year until 1902. They are now contained in all the halls except the north hall and the north-east and east-north ranges, while in the south-east range they have been united so as to form a complete second story. The main entrances to the galleries are from the rotunda, and nearly the entire series may be traversed without descending to the floor. The width of the galleries is from 10 to 14 feet and their height above the floor 16 feet. They are of very simple construction, consisting of plain iron pillars and girders, with brick archways and cement floors. The area gained by this means has amounted to 25,828 square feet.

All of the masonry of the exterior walls above ground, except as noted below, is of red brick laid in black mortar, with numerous horizontal courses of black brick, and a considerable quantity of buff brick in courses and designs to relieve the monotony of color. A number of blue brick were originally employed in connection with the buff, but they were subsequently painted black. There is a base course of granite around the entire building, but the window sills, copings, etc., are of gray Ohio sandstone.

The interior walls are plastered in a sand finish, and were originally covered with a gray water-color paint, poorly adapted as a background for installation. The exhibition cases have been mainly constructed with mahogany frames, for which maroon was found to be a most harmonizing and effective surrounding, and since about 1883 most of the walls have been painted this color to a height of about 12 feet from the floor, the original color remaining for the most part above. The only decorations were stenciled figures on the walls of the rotunda and over the archways at the inner ends of the main halls. In 1902, however, experiments were made looking to a change of color, with what is regarded as very satisfactory results. The colors used in the main halls and courts are a light red to a height of 15 feet, followed

by a deep ivory, the ceilings being of a lighter ivory. In the rotunda the colors range from olive below to ivory above, with stencil decorations as shown in the plates. This color scheme has not been extended to the ranges, which have been repainted from time to time in various colors.

In connection with the original construction of the building, though under a special appropriation, a floor of encaustic tiles was laid in the rotunda, and floors of marble squares of various colors in the four large halls or naves. The marble tiling is surrounded by a frieze of dark-blue slate, of sufficient width to bridge the ducts containing the steam pipes, wires, etc., while around the frieze is a border of particolored Portland cement. The floors in all the other halls were constructed of yellow pine, partly in preparation for the Garfield inaugural ball of March 4, 1881, out of the local fund for that purpose. These floors were laid upon a concrete base and began to decay after a very few years, requiring frequent and extensive repairs. In 1891 it became necessary to replace several of them with more substantial material, and this continued down to 1898, when the last of the wooden floors disappeared. The substitutes have been cement, granito, and finally terrazzo, the last being the most pleasing and apparently the most durable. Other floor changes have consisted in the laying of mosaic pavements in the vestibules of the main entrance and the northwest entrance. In the pavilions and towers the different stories are separated by arches of brick and concrete, supported by iron beams, the floor covering being of Florida pine. Thus the building has been rendered essentially fireproof in all parts of its construction.

An octagonal fountain basin, 20 feet in diameter, composed of a rim of molded polished granite and cement floor, occupies the middle of the rotunda. From its center rises the original plaster model of the goddess of liberty which, in bronze, surmounts the Dome of the United States Capitol.

As before stated, the building was constructed with four main entrances, one at the center of each front, but only two of these are now used as such, that on the north side being for the public and that on the east side for the delivery of supplies and specimens. The entrances on the south and west have been closed and, together with the adjacent space, converted into headquarters for the departments of biology and anthropology, respectively. There is also a small entrance on the south side of the northwest pavilion leading directly to the administrative offices.

The north, or main, entrance has two sets of double doors of black walnut paneled with heavy plate glass, the large arched space above being filled in with a latticework of walnut set with glass. In front of the entrance is a mosaic platform, bordered by granite coping, and

WEST-SOUTH RANGE, NATIONAL MUSEUM BUILDING. EXHIBITION OF SYSTEMATIC GEOLOGY.

approached by four low granite steps 37 feet long, which are flanked by molded base blocks carrying large candelabra.

The smallness of the original appropriation prevented the construction of a basement under the main building, which would have added a large amount of space for storage and workrooms. Small cellars were built, however, under the southwest pavilion for the heating boilers and the supply of fuel and under the northwest and northeast pavilions for miscellaneous storage. Advantage was taken of the changes in the heating plant in 1901 to construct an underground tunnel, leading from the northwest pavilion of the Museum building to the east wing of the Smithsonian building, primarily to convey the heating pipes, electrical conduits, etc., but of suitable dimensions to serve as a passageway for individuals, being 70 feet long, 5 feet wide, and 7 feet high. It has proved of great convenience in stormy weather, but fills a much more important purpose at night by giving the small watch force a ready means of communication between the two buildings.

The building is exceedingly well lighted, considering its solid, one-story construction. The ranges are amply provided with large windows, the higher naves and courts have both skylights and clerestory windows, and the naves also receive much light from the large windows between the central towers. The exhibition collections can, therefore, as a rule, be readily seen, though the galleries are responsible for the creation of some dark places which did not formerly exist. The lighting of the rooms in the towers and pavilions is also excellent. The windows are practically all of the same general pattern, and in the beginning all were glazed with double panes of glass, the better to retain the heat in winter, but about half of these double panes in the towers and pavilions have been made single. Ventilation is provided for by means of movable panes of glass in the side windows and lanterns, many sashes being pivoted in iron frames for that purpose, and also in places by ventilators in the roof.

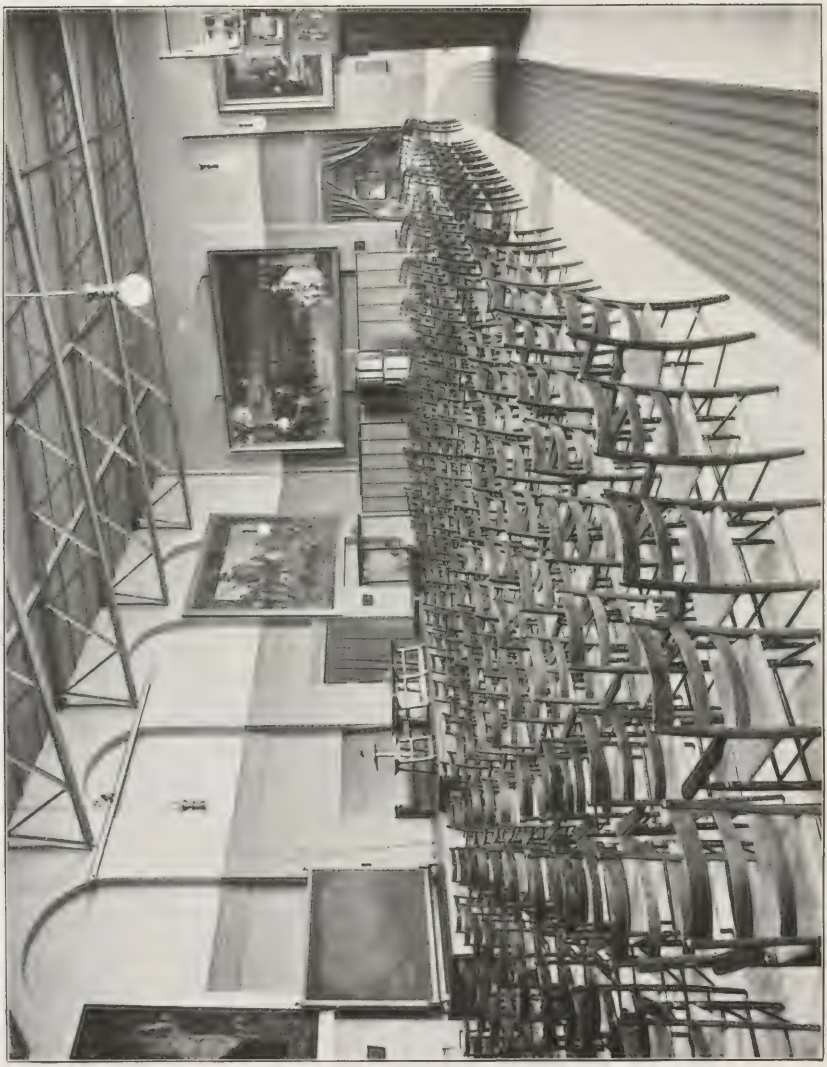
In 1881 the Museum was presented by the Brush Electrical Company with a number of storage cells and a dynamo suitable for operating between 30 and 40 incandescent and 16-candle power lamps in the lecture hall when evening meetings were held. In 1895 the basement of the south tower of the Smithsonian Institution was furnished with a gas engine and dynamo of sufficient power to maintain a small system of incandescent lamps in the Smithsonian offices and in a number of workrooms and other dark places in both buildings. This plant was totally inadequate for the requirements, however, and Congress appropriated $3,500 in 1901, and $5,000 in 1902, for a complete installation of electric wires and fixtures throughout the Museum building, which was practically finished in the latter year, the work being done by employees of the Museum. This installation extends to the public halls, offices, laboratories, storerooms, and workshops, but in the

Smithsonian building it reaches only some of the offices and corridors, a few storerooms, and the dark center of the main exhibition hall. The current for lighting is taken from the mains of one of the city companies at the southwest corner of the Museum building. On only a few occasions has the entire Museum building been lighted at night, and regular night opening for the public can not be undertaken without an additional appropriation to cover the extra expense of electric current and watchmen.

All of the cases in the exhibition halls containing especially valuable specimens, as in the historical and gem collections, are supplied with electric burglar alarms. There is also a system of electric call boxes distributed through both buildings, which must be visited every hour during the night watches, any failure to perform this service being at once automatically announced at the office of the Mutual District Messenger Company in the city. For the prompt conduct of business it has likewise been found necessary to make extensive use of the telephone system for communication between offices in different parts of the building and with the city.

The heating of the Museum building was until 1901 accomplished by means of four 60-horsepower steam boilers. In the latter year these were replaced by two 150-horsepower high-pressure tubular boilers, whose capacity is sufficient to heat both of the large buildings and the smaller adjacent buildings on the Mall. The boiler room is in the basement of the southwest pavilion. There are also two boilers of 48-horsepower in the basement of the Smithsonian building, which can be used in case of emergency. The new plant is very satisfactory, and much more economical than the old one.

Soon after the Museum building was completed, the north-west range was set apart as a temporary lecture hall, being furnished with a platform, lantern screen, and several hundred folding chairs. This was one of the smaller ranges, and proving inadequate for the requirements, its fittings, somewhat improved, were transferred to the west-north range, which continued to be assigned to this purpose, though sometimes used for the preparation of exhibits, until the increasing demands for exhibition space caused it to be turned over to the Department of Anthropology. It was found, however, practically essential to have some place for scientific meetings, and by placing material in storage it became possible to vacate for this purpose the east-north range, immediately to the east of the main entrance, and thus equally as convenient as the former range. The hall remains in a condition suitable to be turned over to exhibition uses at any time, but its fixtures for lecture purposes are more permanent in character than before. The walls and ceiling have been painted in several tints of green. There is a large speaker's platform and a lantern screen, and on the opposite side a smaller platform or balcony, where the lantern



LECTURE HALL, NATIONAL MUSEUM BUILDING.

can be permanently installed. Movable armchairs are used for seats, and a series of screens are in readiness to reduce or enlarge the lecture space, according to the requirements. The furniture is entirely of oak. The preparation of this new lecture hall was accomplished in 1901, under a special Congressional appropriation.

The three floor rooms of the east tower south of the entrance, with a slight addition for kitchen purposes, were utilized for a lunch room until 1901. In that year, however, the addition referred to was extended southward to a total length of 77 feet, thus somewhat enlarging and improving the conditions, but there is no way of providing a suitable lunch room in the present building, important as this feature is to the employees and to such visitors as spend much time about the Museum.

In connection with the plans of the building (pp. 299–302) a list is given of the halls and of all the rooms contained in the several towers and pavilions, together with their sizes and an explanation of the uses to which each is put. The exhibitions in geology and in anthropology, except the single division of archæology, are entirely in this building. In biology only the mammals, reptiles, fishes, and comparative anatomy are represented here, the remaining divisions being provided for in the Smithsonian building. All of the galleries as well as the halls were designed for exhibition purposes, but three or four of the former are now used for storage, and one for the library. The administrative offices and the headquarters for the three scientific departments are in this building, as well as most of the scientific laboratories.

BUILDING FOR THE ALCOHOLIC COLLECTIONS.

Professor Baird stated in his report for 1884 that—

The presence of alcoholic specimens in large numbers, so important in a scientific point of view, greatly endangers the safety of museum buildings and their contents, and most of the establishments in Europe have lately taken the precaution to construct separate buildings peculiarly adapted for the purpose. An application was made at the last session of Congress for an appropriation to put up a similar building in the grounds of the Institution, but it was not acted upon favorably.

The estimate was as follows:

For the erection of a fireproof brick storage building east of the National Museum, for receiving, unpacking, assorting, and storing the natural-history collections of the Government, to replace the wooden structures now used for the purpose, $10,000.

The estimates were renewed for 1886 and 1887 in the following terms:

For the erection of a fireproof building for storing the alcoholic collections of the National Museum, $15,000.

(Note.—The safety of the interior of the National Museum and the Smithsonian building is endangered by the large number of alcoholic specimens kept therein, and it is considered by public museums, both at home and abroad, very important to

have a separate building for their reception and preservation. There are at present no suitable accommodations for these collections.)

In 1885 Secretary Baird remarked that—

Although the present building is practically fireproof, yet should a fire be started in the vicinity of these [the alcoholic] specimens it is probable that much damage would be done by the ignition of the many thousands of gallons of alcohol, and the destruction of the specimens and of the jars in which they are contained.

Again in 1886 he refers to the danger of the destruction not only of the alcoholic specimens themselves, but of other near-by collections should fire break out among the former. All of these propositions failed to receive consideration and the matter was not renewed, as it was then expected to make provision for the alcoholic specimens in the proposed new Museum building.

In connection with the appropriations for 1899, however, an estimate was submitted to Congress for a larger fireproof building to serve essentially the same purpose, fronting on B street south, between the National Museum and the Army Medical Museum, appropriate in appearance to the former building. It was designed to be 130 feet long by 50 feet wide, and intended to be used for both workshops and storage purposes, thus replacing all of the temporary buildings then in use. It failed to receive favorable action, however. The wording of the item was as follows:

For the erection of a fireproof building for workshop and storage purposes for the National Museum, said building to be constructed under the direction of the Superintendent of the Library of Congress in accordance with the approval of the Secretary of the Smithsonian Institution, $50,000.

TEMPORARY AND RENTED BUILDINGS.

The crowded conditions in the Smithsonian and Museum buildings have necessitated the erection from time to time of small frame structures on the Smithsonian and Armory squares, and the renting of buildings south of B street south, for the requirements either of workshops and storage, or of the preparation of exhibits for expositions. The use of the Armory building and the erection of a brick laboratory have already been referred to.

In 1882 a shed was built to the westward of the Armory building, a part of which was used for the shelter of Fish Commission cars, and the remainder filled with the collections received from the permanent exhibition building in Philadelphia. A second shed was subsequently added for the purposes of the National Museum, but only one of these now remains and is utilized by the Museum.

The large amount of work incident to the preparation of collections for the exhibitions at Cincinnati, Louisville, and New Orleans made it necessary to put up a special frame building, which was done at the expense of the exposition fund during the summer of 1884. It meas-

ured about 100 by 50 feet, and was located along B Street south, a short distance to the east of the Museum building. It was also made to serve for the temporary storage of the material brought back from those exhibitions. Some small additions were made and a loft constructed. It remained in use until 1887, when it was torn down and the materials of its construction were utilized elsewhere. During more or less of the period of its existence it furnished accommodations to the taxidermists, and osteologists, and to other preparators, including those of the Bureau of Ethnology. In it were also stored large quantities of specimens, especially geological and ethnological.

In 1887 two low sheds were built along the south side of and close to the Smithsonian building, one on each side of the south tower, and extending nearly the entire length of each façade. They were constructed largely of material from the building last above mentioned, and were both unsightly and dangerous in their proximity to the Smithsonian building. The west shed was at first cut up into seven workshops and storage compartments. The east shed was, for a time, given over to living animals, but when these were removed to the Zoological Park it was used for the storage of cases and supplies. Both sheds were more or less employed in the preparations for the World's Columbian Exposition at Chicago. Their removal was effected in 1898, under the provisions of an act of Congress giving $2,500 for the purpose. The material derived from them was used partly in building a shed at the Ninth street annex, referred to below, and partly in the erection of the so-called south shed on the Mall directly south of the south tower of the Smithsonian building.

The National Zoological Park grew out of a small assemblage of living animals gathered at the National Museum. The first part of this collection was received from the West in 1887 and was installed in one end of the eastern of the two sheds along the south side of the Smithsonian. Additional specimens obtained in the early part of 1888 made it necessary to utilize the entire building for this purpose. Later in the year yards were constructed in the grounds south of the Smithsonian building for buffalo and deer, and several small buildings were also erected. During 1891 the living animals were transferred to the park, and the inclosures and buildings which they had occupied were all removed except the eastern shed and one small shed farther out on the grounds which was modified into a paint shop.

In the winter of 1889-90 the first of the frame buildings now constituting the Astrophysical Observatory was erected south of the eastern end of the Smithsonian building. It was subsequently slightly enlarged, and three other smaller structures were added in 1893 and 1898. The fence inclosing this cluster of buildings has recently been enlarged to afford some open-air space for experimental purposes, the extent of the area now covered being about 176 by 78 feet.

In 1898 a frame building of two stories, called the "south shed," was built on the grounds south of the south tower of the Smithsonian building, being separated from it by the roadway and a strip of lawn. It is about 53 feet long, 40 feet wide, and 23 feet high to the eaves. It contains the taxidermists' laboratories for mammals and various workshops.

The only structures now standing on the Mall near the Smithsonian and Museum buildings are the laboratory and stable building, the south shed, and the buildings of the Astrophysical Observatory. This clearing of the grounds, however, has only been rendered possible through the appropriation of funds by Congress for the renting of outside buildings, chiefly south of B street south, and not far distant from the Museum, as follows:

Louisiana avenue near Tenth street NW., from March 15, 1894, to June 30, 1895, a period of fifteenth months and sixteen days, at $75 a month.

A part of the old Belt Line street-car stable, corner of B and Third streets SW., from July 1, 1895, to March 31, 1896, nine months, at $75 a month.

No. 431 Ninth street SW., from April 1 to June 30, 1896, three months, at $75 a month; from July 1, 1896, to date, at $166.66 a month, the increase being due to extensive improvements in buildings.

No. 217 Seventh street SW., August, 1898, at $90 a month; September 1, 1898, to June 30, 1899, ten months, at $120 a month; July 1, 1899, to date, at $90 a month.

No. 313 Tenth street SW., August 1, 1898, to June 30, 1901, thirty-five months, at $50 a month; July 1, 1901, to date, at $80 a month. The increased rental in this case was due to the erection of an addition to the original building.

Rear of No. 915 Virginia avenue SW., August 1, 1898, to June 30, 1899, eleven months, at $50 a month; July 1, 1899, to date, at $30 a month.

The total amounts paid annually for rental of the above buildings were, therefore, as follows:

1894	$263.71
1894–95	900.00
1895–96	900.00
1896–97	1,999.92
1897–98	1,999.92
1898–99	4,389.92
1899–1900	4,039.92
1900–1901	4,039.92
1901–2	4,399.92
1902–3	4,399.92
Total	27,333.15

The temporary buildings on the Mall and the rented buildings now used for the purposes of the Museum, together with the floor area occupied in each, are as follows:

	Square feet.
Natural history laboratory and stable, on Smithsonian grounds, bird taxidermists on second floor	615
South shed, on Smithsonian grounds south of Smithsonian building, mammal taxidermists, 1,060 square feet; tin shop, 340	1,400
Frame shed adjoining building of U. S. Fish Commission on Armory square, for storage, as follows: Anthropology, 5,562 square feet; biology, 1,318 square feet; geology, 193 square feet	7,073
Museum Annex at 431 Ninth street SW., consisting of one brick building and several frame sheds. Rented. Used for storage, as follows: Anthropology, 6,500 square feet; biology, 3,742 square feet; geology, 3,456 square feet; superintendence and miscellaneous, 7,431 square feet	21,129
Building 309–313 Tenth street SW. Rented. Utilized for storage and other purposes, as follows: Anthropology, 1,102 square feet; biology, 922 square feet; geology, 3,053 square feet; label office, 729 square feet; heating and power plant, 620 square feet	6,406
Building at 217 Seventh street SW. Rented. Utilized as a carpenter shop, 3,387 square feet, and anthropological workroom, 268 square feet	3,655
Building in rear of 915 Virginia avenue SW. Rented. Utilized as a paint and glass shop	2,925
Total area	43 203

NEW NATIONAL MUSEUM BUILDING.

HISTORY.

In his report for 1882 Secretary Baird discussed the inadequacy of the Museum building, then scarcely more than a year old, to house the rapidly increasing national collections or to provide for the Museum's own activities and those of the Geological Survey, the latter at that time being partly carried on under the same roof. It was proposed that a third building be erected on the southwest corner of the Smithsonian reservation for the geological and mineralogical divisions of the Museum and for the accommodation of the Geological Survey. Secretary Baird's remarks on this subject were as follows:

Large and capacious as is the new Museum building, it has proved already inadequate to the existing requirements of the National Museum. This building was designed primarily to accommodate the vast number of industrial and economical exhibits presented to the United States by foreign governments at the close of the Philadelphia Exposition of 1876. A special appropriation was made by Congress for their transfer to Washington, and the armory building in the square between Sixth and Seventh streets was assigned for their reception. It required nearly sixty large-sized freight cars to transport the mass.

Before the building was completed in 1881 and available for its purposes, almost equally enormous additions had been made to the collections of the various Government expeditions and of the Ethnological Bureau, which, together with many thousands of objects previously in charge of the Smithsonian Institution, but for which there was no room in the old building, constituted a much larger mass than was

originally estimated. It is well known that at the close of the Centennial Exposition a company was organized to take charge of a large portion of the collections exhibited on that occasion, and with these and such additional articles as might be obtained to establish what was known as the "Permanent Exhibition" in the main Centennial building, which covers nearly 18 acres. This organization, after struggling for existence for several years, finally became unable to continue the effort and the collections in its charge were speedily scattered. Many of these had been presented to the National Museum with the understanding that they were to be left with the Permanent Exhibition Company for a period of at least a few years. Others, however, including many of the most valuable series, were obtained for the National Museum through the efforts of Mr. Thomas Donaldson. All these collections were carefully packed under his charge and stored in a building erected by him adjacent to the Centennial building.

An appropriation was made by Congress to meet the cost of packing, shipping to Washington, and storing the collections in question. About twenty cars were required to transport them. They are now contained in a wooden building adjacent to the armory, there being absolutely no space for them in the National Museum.

In addition to this a cabinet of at least double the magnitude, made by the Institute of Mining Engineers and deposited with the Pennsylvania Art Museum of Philadelphia, has been offered to the Government simply on the condition of transfer to Washington and proper exhibition. This is an extremely important collection, illustrating the mining resources and metallurgy of the United States and foreign countries, and will constitute a most important addition to the means of instruction at the command of the Government. An appropriation will be asked, and it is hoped obtained, for the purpose of transferring the collection to Washington; but some measures must be taken for its ultimate display.

An even greater mass of additional material to be provided for will be found in the industrial collections of the United States census of 1880, and in the collections of the U. S. Geological Survey. The census collections embrace more particularly the building stones of the country, the ores (especially of the precious metals), the combustibles, such as coal, petroleum, etc., and the forest timber.

All these collections are of great magnitude, representing as nearly as possible a full series from all parts of the country. They are carefully labeled and recorded, and will be accompanied by full descriptions.

The building-stone collection is especially valuable, consisting, as it does, of many thousands of samples of marble, granite, sandstone, and other substances, for the most part dressed in 4-inch cubes, each of the faces showing a different surface and treatment.

It is not believed that any established quarry remains unrepresented in this series, while many extremely valuable deposits of ornamental and building stones are presented therein for the first time. Preparations are in progress for testing the strength, resistance to torsion and crushing force, and economical properties of all these samples. The collection is now so far advanced that when a public building is to be erected either by the States or the General Government it will be possible to show specimens of all the best building stones in the vicinity of the locality involved, and to present all the necessary data as to availability, durability, cost of production, etc. Much use has already been made of the collection by the commissioners of State capitals, county court-houses, etc., as well as by agents of the General Government.

The collection of ores made by the census agencies is also very extensive, that of iron being particularly large. Nearly every iron mine of any prominence in the United States has been visited and samples carefully selected by experts. These have been analyzed under the direction of Professor Pumpelly, and reports presented as to their chemical and metallurgical properties and economical value. All the

originals of this research are in charge of the Smithsonian Institution awaiting exhibition. The same may be said of similar researches in regard to the ores of all the other metals.

The work of the U. S. Geological Survey, also of enormous magnitude—begun under Mr. Clarence King and continued under Maj. J. W. Powell—has resulted in the accumulation of several tons of specimens of fossils, rocks, minerals, ores, and the like. Very few of these can at present be exhibited for want of the necessary space. The survey requires a large number of experts and assistants, and is at present very badly accommodated. Some twenty rooms in the new Museum building have been assigned as quarters for the Director of the Survey and his assistants.

This, however, causes great inconvenience to the other work of the Museum, and as the survey now occupies a large building in Washington, for which it pays considerable rental, and for want of quarters in Washington is obliged to scatter its stations over various parts of the United States, it is thought desirable to ask Congress for an appropriation to erect a second museum building corresponding in general character to the first, but on the opposite side of the square, along the line of Twelfth street.

This building it is proposed to devote almost entirely to the mineral department of the National Museum; and when completed to transfer to it everything of a geological and mineralogical nature, and also to prepare a portion of it especially for the accommodation of the Geological Survey, which is at present so inconveniently provided for. By way of economy it is proposed at first to construct what will represent the western side of the building, in which office rooms and chemical and other laboratories can be provided for.

It had been proposed to erect a separate building for the Geological Survey, disconnected from the National Museum; but there being no ground available for this purpose, it was thought expedient to ask for an appropriation to furnish the required quarters on the Smithsonian reservation, which is at present ample for the purpose.

On the 10th of April last the following bill was accordingly introduced into the House of Representatives and referred to the Committee on Public Buildings and Grounds. The subject is still before that committee, and it is impossible to state what will be its fate during the present session. I would recommend action on the part of the Board of Regents in this connection, since long before the edifice can be completed the need for it will become extremely urgent.

"A BILL (H. R. No. 5781) for the erection of a fireproof building on the south portion of the Smithsonian reservation, for the accommodation of the United States Geological Survey, and for other purposes.

"*Be it enacted, &c.*, That the sum of two hundred thousand dollars be, and hereby is, appropriated, out of any money in the Treasury not otherwise appropriated, for the erection of a fireproof building on the south portion of the Smithsonian reservation for the accommodation of the United States Geological Survey, and for other purposes: *Provided*, That the consent of the Regents of the Smithsonian Institution be first obtained thereto, and that the building be under their direction when completed: *And provided further*, That the building be erected by the Architect of the Capitol, in accordance with plans approved by the Director of the United States Geological Survey, the Secretary of the Smithsonian Institution, and the Architect of the Capitol acting as a board therefor."

At the annual meeting of the Board of Regents on January 17, 1883, Secretary Baird presented the report from which the above extract is taken, called attention to House bill 5781, introduced in April, 1882, and urged the necessity for speedy action in relation to

an additional building for the use of the Museum and the Geological Survey, whereupon the following resolution was adopted:

Resolved, That the Board of Regents of the Smithsonian Institution recommend to Congress to enlarge the National Museum, so as properly to exhibit the mineral, geological, and other collections already on hand and increasing each year, by the erection of a fireproof building on the southwest corner of the Smithsonian reservation, similar in style to the present N tional Museum; and they request an appropriation of $300,000 therefor, to be expended under the direction of the Regents of the Institution.

It was also resolved—

That the chancellor, General Sherman, and the Secretary be, and they are hereby, authorized and empowered to act fo and in the name of the Board of Regents in carrying into effect the provisions of any act of Congress which may be passed providing for the erection of an additional building for the Nat'onal Museum.

Further strong reasons for the erection of an additional building were given in the report of Secretary Baird for 1883, in which he says:

No better illustration can be had of the increase in the collections of the National Museum than the fact that an additional building is urgently required for their proper accommodation, as explained in the last report (1882).

In 1875 the collections then in charge of the Smithsonian Institution were comfortably accommodated within the limits of the Smithsonian building, in rooms having an aggregate area of 30,000 square feet. They consisted principally of specimens of natural history and ethnology; confined almost entirely to North America, with the exception of objects of Polynesian manufacture, forming part of the Wilkes collection.

In 1875 an appropriation was made by Congress to enable the Smithsonian Institution and the Fish Commission to prepare an exhibit of objects illustrating the resources of the United States, as derived from the animal and mineral kingdoms, and, with the assistance of a special appropriation to the Indian Bureau, of a collection of North American anthropology. A large sum of money was expended in the preparation of this exhibit, which was forwarded to Philadelphia in 1876, and constituted a part of the Government display which attracted much attention.

At the close of the Philadelphia exhibition very large donations were made to the United States by foreign countries, including both the official commissioners and individual exhibitors. Many objects of much interest were contributed on the same occasion from American displays. These collections, filling some fifty freight cars, were brought to Washington and were stored for a time in the Armory Building, assigned by Congress for their reception.

After several fruitless efforts, an appropriation of $250,000 was obtained for the purpose of putting up an inexpensive edifice for the storage of these articles, and their transfer was begun in the autumn of 1881, but little more than two years ago.

Since then large numbers of collections of very great importance have come to hand, chief among them being the gatherings of the U. S. Geological Survey and of the Ethnological Bureau, made on a scale of unexampled magnitude and well befitting the operations of a nation like the United States. The many scientific explorations, made either separately by the Smithsonian Institution or conjointly with the United States Signal Service or other bureaus or bodies, the work of the Fish Commission, and the enormous aggregate of many smaller collections, have tended largely to increase the material to be provided for.

In addition to this, the exhibition by the United States at London of illustrations of its fisheries (the freight bulk of which amounted to not less than 24,000 cubic feet, and consisting, in very large part, of new objects and articles obtained at the expense of the appropriations of Congress for that purpose) must also be provided for; as also the very valuable and extensive collections in mineralogy, geology, and metallurgy made by the American Institute of Mining Engineers, and presented to the United States, but stored in Philadelphia awaiting an appropriation for its transfer.

It may be stated in brief, therefore, that, at the present time, the vast building, finished scarcely more than two years ago, is now filled to overflowing; while there is additional material enough on hand belonging to the Government to occupy fully half of a second building of the same size, and with a probability that the entire space will be required before the construction can be accomplished, even supposing that it is begun at the earliest possible time.

The Smithsonian Institution has always acted in hearty cooperation with the affiliated scientific branches of the Government even where no official relationship existed, this being notably the case in regard to the U. S. Geological Survey. This important Bureau, in the rapid increase of its work, has been greatly hampered by want of the necessary accommodations; and it was with much gratification that the Institution proffered a share of the new building to the Director, Major Powell, for the accommodation of his collections, and for the office and laboratory work. It was, however, unable to do as much as was desirable, owing to the inadequacy of quarters for the purpose.

Should an appropriation be made for the new building, for which the Board authorized application to Congress, it is intended to share it with the Geological Survey so that it may have all the facilities required for its important work.

It will be remembered that Congress in the act of 1846 set aside for the use of the Smithsonian Institution 20 acres in the southwest corner of the square bounded by Seventh and Twelfth streets and north and south B streets, the center of the Smithsonian building being exactly in the middle of the square. It was in the southeast quarter of this reservation that the new Museum building was erected, forming a very unsymmetrical annex to the original Smithsonian building. It is now proposed to take the southwest corner of the reservation for the new edifice, which, when completed, will be essentially of the general character of the present Museum building, and will restore the proper architectural balance.

Congress has now been asked to make an appropriation for one wing of this new building to be specially fitted for the use of the officers and laboratories of the National Museum and of the Geological Survey; and, if the amount can be obtained at the present session, occupation of the building can be assured within eighteen months from the commencement of operations. The vacating of the rooms now occupied by the Geological Survey will also furnish much-needed accommodation to the Museum; possibly enough until the remainder of the building can be provided for. The proposed wing, however, will be complete in itself, architecturally, and will not involve any addition for its proper harmonious effect.

The following estimate, based upon the recommendation to Congress above referred to, was submitted in 1883 for consideration with the appropriation bills for 1885, but failed to be reported to either House:

Construction, in a fireproof manner, of an additional museum building, to receive the collections and laboratories in chemistry, geology, mineralogy, metallurgy, taxidermy, etc.; and for the offices and laboratories of the U. S. Geological Survey, to be erected under the direction and supervision of the Regents of the Smithsonian Institution, on the southwest corner of the grounds of the Smithsonian Institution, $200,000.

From 1882 until the present time the necessity for a new building has never ceased to be the subject of greater or less attention by the Regents and the Secretary. In 1885, after noting the previous steps taken, Professor Baird remarked:

The need is now much greater than before, as there is enough material in the way of valuable specimens of economical interest to fill a second building the size of the present one. This unexhibited surplus is now stored in several buildings, some in Washington and some elsewhere, and consists of important illustrations of the economical geology, metallurgy, and other resources of the United States. In addition to what has been on hand for some time, very large collections were presented to the Government at the New Orleans exhibition, which embraced a great deal of intrinsic value as well as of popular and scientific interest. It is earnestly to be hoped that this requirement will be met by Congress by the speedy appropriation of an amount suitable for the purpose.

In 1886 Secretary Baird stated that as special provision was desired for laboratories and offices, and to give suitable quarters to the U. S. Geological Survey and the Bureau of Ethnology, an estimate had been made of the sum of $250,000 for the purpose of constructing one wing and pavilion of the new building, leaving the remainder to be constructed hereafter, should Congress so approve it, at a cost of, perhaps, an additional $250,000. This estimate, submitted in 1886 for the sundry civil bill for 1888, varied but slightly in wording from the estimate of 1883. It received no consideration by Congress and was as follows:

For commencing the construction, in a fireproof manner, of an additional museum building to receive the collections and laboratories in chemistry, geology, mineralogy, metallurgy, taxidermy, etc., and for offices and laboratories of the U. S. Geological Survey, to be erected under the direction and supervision of the Regents of the Smithsonian Institution on the southwest section of the grounds of the Smithsonian Institution, $250,000.

The following extract is from the Museum report of the same year, by Doctor Goode:

The National Museum is now approaching an important crisis in its history. Its future will depend upon the action of Congress in granting it an additional building, for without more room its growth can not but be in large degree arrested. From this time forward it will be impossible to develop the collections satisfactorily without additional space. The laboratories and workshops are already entirely inadequate for the storage of the unexhibited collections and the accommodation of the preparators and mechanics, and the exhibition halls do not afford suitable opportunity for the display of the materials already in order for public examination.

At the annual meeting of the Board of Regents on January 11, 1888, the first held after the appointment of the present Secretary of the Smithsonian Institution, Mr. Langley brought to the attention of the Regents the necessity of continuing the efforts toward securing an additional museum building, and spoke of the legislation previously proposed. The Board renewed its recommendation to Congress of January 17, 1883, and discussed the matter of providing quarters for

the Geological Survey in the new building, pursuant to the wording of House bill No. 5781, presented to Congress in 1881, and of the several estimates subsequently submitted. The chancellor stated as his opinion—

That it was desirable that new museum buildings should be erected in any case, but that since by act of Congress a certain part of the public grounds had been set apart and appropriated absolutely and exclusively to the Smithsonian Institution, he for one did not want to see anything else placed on these grounds.

He further said:

If the Smithsonian Institution is to grow, it will need them all, and whatever is put upon them should be under our exclusive control.

The following extract from the report of Secretary Langley for 1888 has reference to this subject:

Among other matters discussed at the last meeting of the Regents was the erection of a new Museum building. On this occasion the Regents tacitly reaffirmed their resolution of 1883, recommending to Congress the enlargement of the National Museum by the erection of a fireproof building on the southwest corner of the Smithsonian reservation, similar in style to the present National Museum; but on viewing the sketch plans, which had been prepared subsequently to the resolution, so as to include offices for the Geological Survey, they added an expression of their opinion that the new building should be planned exclusively for Museum purposes.

It was not at first intended to take action in this matter during the present year, but the overcrowded condition of the building, on account of which not only the current work but the proper development of the collections is greatly impeded, seemed to render immediate action necessary. A still more urgent need appeared to be the unsatisfactory sanitary condition of the new Museum building. A committee, consisting of Dr. J. H. Kidder, chairman, Dr. James M. Flint, U. S. Navy, and Mr. J. E. Watkins, was appointed on April 14, to make a careful study of the water supply, ventilation, and drainage, and in May submitted a preliminary report, from which it appeared that an alarming amount of sickness and mortality has been manifest among the employes since 1881—a mortality which can not be attributed to the location of the building, which has sometimes been pronounced unsanitary, since there has been no corresponding percentage of ill health in the old Smithsonian building adjoining. The number of days lost by employees on account of sickness in 1886 was 796; in 1887, 875; and in 1888, up to May 10, 213, by far the largest part of this loss of time being attributed on the books of the Museum to miasmatic diseases. The committee states that there is no reasonable doubt that some, if not all, of the ten deaths since 1881 were hastened or induced by the unwholesome condition of this building. The committee suggested repairs and modifications of considerable extent, including the construction of continuous cellars under each of the four sides of the building, which, in addition to the other necessary expenses, would cost in the neighborhood of $40,000. This state of affairs seemed to demand decided action, and it being absolutely impossible to make any changes in the present building without entirely vacating a portion of it for a considerable period of time, the exigency for more accommodation seemed a great deal more urgent than had been at first supposed.

While it became evident, on study of the question, that for the ultimate needs of the Museum, a building of but one story, occupying the same area as the present Museum, would be insufficient, the question of immediate action was unexpectedly brought up in May by one of the senior Regents, a member of the Senate, who, when

visiting the Museum with some friends, noticed its crowded and unsatisfactory condition. Having learned from me of the mortality and sickness of the employees, he inquired as to the feasibility of erecting a new building, and offered to use his influence to procure an appropriation, if I could obtain for him a set of sketch plans within a week, time being, as he stated, a very essential condition. After consulting with the chairman of your executive committee, I had no hesitation in accepting such an offer, but a difficulty arose from the fact that the sketch plans which had been laid before the Regents in 1882 were in part for purposes which the Regents had at their last meeting disapproved, and that hence they could not be used. By great diligence, however, plans for a building to be devoted exclusively to Museum purposes were prepared within the time mentioned. These were based upon an extensive accumulation of notes and drawings, embodying the record of the best recent work of museum construction in this country and in Europe, and they were for a building, as far as was consistent with these improvements, like the existing Museum. The report submitted by Senator Morrill, to accompany Senate bill 3134, contains the correspondence on which action was taken, and I have discussed the acts therein presented elsewhere under the proper heads.

The following bill was introduced by Senator Morrill on June 12, was passed by the Senate on June 20, and at the end of the fiscal year was in the hands of the House Committee on Public Buildings and Grounds:

"A BILL for the erection of an additional fireproof building for the use of the National Museum.

"*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the sum of five hundred thousand dollars is hereby appropriated, out of any money in the Treasury not otherwise appropriated, or so much thereof as may be necessary, for the erection of a fireproof building for the use of the National Museum, to cover three hundred feet square, and to consist of two stories and basement, to be erected under the direction of the Regents of the Smithsonian Institution, in accordance with the plans now on file with the Committee on Public Buildings and Grounds of the Senate, on the southwestern portion of the grounds of the Smithsonian Institution. Said building to be placed west of the Smithsonian Institution, leaving a roadway between it and the latter of not less than forty feet, with the north front on a line with the south face of the building of the Agricultural Department and of the Smithsonian Institution; and all expenditures for the purpose herein mentioned shall be audited by the proper officers of the Treasury Department."

The building, as proposed, covers the same area as the present Museum, and is of the same general style, so far as is consistent with the introduction of a second story, thus affording nearly three times as much accommodation under the same area of roof as the building now in use. The arrangement of the interior of the proposed new structure is, however, considerably modified, as the result of the experience of seven years' occupation of the present building. The eighteen exhibition halls on the two main floors are completely isolated from each other, and are capable of subdivision into smaller halls. The lighting will be equally as good as in the present building, the ventilation will be much better, and in other important respects the sanitary arrangements will be far more satisfactory.

A basement story is absolutely necessary, not only with a view to promoting the comfort and health of visitors and employees, as well as for securing greater dryness and better preservation of the specimens, but also for the purpose of providing large apartments for storerooms and workshops. These proposed improvements in arrangement will not, however, interfere with the possibility of constructing a building which shall conform in the essential points of exterior proportion with the main features of the present building.

The present building contains about 80,000 square feet of floor space available for exhibition and storage. The building proposed will contain about 220,000 square feet. The amount of room for offices and laboratories would be about the same in each. The net area in the new building available for exhibition, storage, and office rooms, as estimated, would be between five and six acres.

For the construction of the present Museum building an appropriation of $250,000 was made. This sum was supplemented by the following special appropriations: $25,000 for steam-heating apparatus, $26,000 for marble floors, $12,500 for water and gas fixtures and electrical apparatus, and $1,900 for special sewer connections. The total amount expended on this building was therefore $315,400, and it is generally admitted that the cost of its construction was considerably less than that of any other similar building in existence; in fact, perhaps too cheap to secure the truest economy.

The proposed structure can be erected at a proportionately smaller cost. I have obtained from responsible bidders, who are willing to give bonds for the completion of the work in accordance with the bids which they have submitted, estimates for the erection of the building complete, with steam-heating apparatus and all other essential appliances, excepting the electrical equipment, amounting in the aggregate to $473,000. These bids, upon which the estimates of cost have been made, were not competitive, and it is possible that something may be saved through competition. It is, however, necessary to provide also for the architect's superintendence, and for the removal and reconstruction of the Smithsonian stable, which now occupies the site. I therefore think it advisable to make request for the sum of $500,000, in order that these additional items and other contingencies may be covered.

The plans, though drawn in the limited time imposed, represent the results of an exhaustive study—which has extended over several years—of plans of the best modern museum buildings in Europe and America, nearly all of which have been personally inspected by officers of the Smithsonian Institution.

Senate bill No. 3134, above quoted, when presented to the Senate on June 12, 1888, was accompanied by a favorable report from the Senate Committee on Public Buildings and Grounds (No. 1539), and contained two letters from Secretary Langley, dated June 2 and 8, 1888. The former referred mainly to the plans for the proposed building, the latter to the collections and needs of the Museum. On June 21, an effort was made to have this bill attached to the sundry civil bill, an amendment to that effect being proposed by Senator Morrill, but no progress was gained by this action, and the bill went over to the next session.

On January 17, 1889, Senator Morrill again submitted the measure as an amendment to the sundry civil bill for 1890, and it was referred to the Committee on Appropriations, but no action was taken. In his report for the same year Secretary Langley shows the increased necessity for additional space, in that Congress at its previous session had granted the Armory building to the Fish Commission as its headquarters, requiring the Museum to remove therefrom all but a few of its preparator's workrooms.

On December 10, 1888, and December 19, 1889, bills were introduced in both houses of Congress for the erection of a fireproof building for the U. S. Geological Survey independently of the National

Museum, on the south side of the Mall between the Museum building and that of the Army Medical Museum, the amount requested for the purpose varying in the several bills and amendments thereto from $300,000 to $800,000. Both of these measures failed to pass. The report of the House Committee on Public Buildings and Grounds, submitted February 16, 1889, contains a letter from the Director of the Survey, from which the following extracts, interesting in this connection, are taken:

In addition to the rooms in the rented [Hooe] building, through the courtesy of the Secretary of the Smithsonian Institution the Survey is permitted to use twenty-two rooms in the National Museum, and these are all crowded in such manner that work is seriously obstructed. The rooms in the National Museum were temporarily given to the Survey at a time when there was no pressing necessity for their use by the officers of the Museum; but at the present time the entire Museum is so crowded that the Secretary of the Smithsonian and the Director of the Museum are anxious to have these rooms surrendered for their use. * * *

The building planned does not provide for museum space. The statutes now provide that the collections of the Geological Survey, when no longer needed for investigations in progress, shall be deposited in the National Museum. The plan contemplated in the bill before your committee provides that the building for the Geological Survey shall be near to the National Museum—between that building and the Army Medical Museum building. Such an arrangement of buildings will be highly advantageous to the Survey, as the offices of the Survey would be adjacent to the National Museum, and the materials stored in the Museum building would be accessible for reference and comparison, as constantly needed.

In his annual report for 1890, Assistant Secretary George Brown Goode, in charge of the Museum, made the following statements regarding the necessity for a new building:

The necessity for additional room is constantly increasing, and several of the collections, to wit, transportation and engineering, fishes, reptiles, birds' eggs, mollusks, insects, marine invertebrates, vertebrate and invertebrate fossils, fossil and recent plants, are in some instances wholly unprovided for, and in others only in a very inadequate degree.

In the main hall of the Smithsonian building is still exhibited the collection of birds. A few cases containing birds' eggs and shells have recently been arranged along the center of this hall.

Eleven of the departments in the National Museum have no space assigned to them in the Museum building, solely on account of its crowded condition. The collection of prehistoric anthropological objects remains installed on the second floor of the Smithsonian building. The collections of the remaining ten departments can not be exhibited or even properly arranged and classified without more room. These collections are at present stored in the attics and basements of the Smithsonian and Armory buildings, and are inaccessible for study and for the other purposes for which they were obtained. The specimens comprising these collections are not simply objects of natural history, possessing an abstract interest to the student, but represent the application of natural objects to the industries, and, as such, are of great importance. There are several collections of ores, minerals, building stones, and of objects representing various arts and industries, which are of very great value, since they furnish to the American manufacturer and designer information of inestimable importance.

The increase in the national collections during the last eight years may perhaps be best described by the statement that in 1882 the total number of specimens recorded in the Museum was about 183,000; while in 1890 the records indicated the possession of nearly 3,000,000 specimens. It is proper to say in this connection that the actual increase was not so great as shown by the records, since during this period a large amount of material previously received had been brought under control and placed on the books of the Museum. It should also be borne in mind that the present Museum building was planned with reference to the reception of the material in its custody at the time of its construction.

During the Fifty-first Congress the question of a new building was frequently under discussion, but without result. On February 19, 1890, Senator Morrill, from the Committee on Public Buildings and Grounds, reported Senate bill No. 2740, which provided:

That for an additional fireproof building for the use of the National Museum, 300 feet square, with two stories and a basement, to be erected under the direction of the Architect of the Capitol, with the approval of the Regents of the Smithsonian Institution, in accordance with plans now on file with the Committee on Public Buildings and Grounds, on the southwestern portion of the grounds of the Smithsonian Institution, there shall be appropriated, out of any moneys in the Treasury not otherwise appropriated, the sum of $500,000; said building to be placed west of the Smithsonian Institution, leaving a roadway between it and the latter of not less than 50 feet, with its north front on a line with the south face of the Agricultural Department and of the Smithsonian Institution, and constructed as far as practicable, after proper advertisement, by contract or contracts awarded to the lowest responsible bidder, and all expenditures for the purposes herein mentioned shall be audited by the proper officers of the Treasury Department.

On April, 9, 1890, the same bill was submitted to the House and referred to the Committee on Public Buildings and Grounds. These bills were again brought up in the second session of the same Congress, in the House on January 9, 1891 (where it was committed to the Committee of the Whole), and in the Senate on February 9, 1891, as an amendment to the sundry civil bill for 1892. The House bill, differing somewhat in wording from the Senate bill, was as follows:

That for an additional fireproof building for the use of the National Museum, 300 feet square, with two stories and a basement, to be erected by the Supervising Architect of the Treasury, under the direction of the Regents of the Smithsonian Institution, in general accordance with plans now on file with the Committee on Public Buildings and Grounds, on the southwestern portion of the grounds of the Smithsonian Institution, there shall be appropriated, out of any moneys in the Treasury not otherwise appropriated, the sum of $500,000; said building to be placed west of the Smithsonian Institution, with its north front on a line with the north front of the present Museum building, and constructed as far as practicable, after proper advertisement, by contract or contracts awarded to the lowest responsible bidder, and all expenditures for the purposes herein mentioned shall be audited by the proper officers of the Treasury Department.

Letters in support of the measure were transmitted to Congress by Secretary Langley, and some arguments were presented on the floor.

The report to the Senate Committee on Public Buildings and Grounds by Secretary Langley, dated January 21, 1890, was mainly as follows:

I send you herewith a set of sketch plans intended to show, in a general way, the extent and character of a building such as would seem to be necessary for the accommodation of the Museum collections in the present and immediate future, and respectfully request for them your attention and a recommendation to Congress of the necessary means for such a building.

These plans and sketches are provisional, but although not presented in detail they represent the results of studies, extending over many years, of the plans of the best modern museum buildings in Europe and America, nearly all of which have been inspected by officers of the Smithsonian Institution.

The proposed building covers the same area as that finished in 1881. It is intended to consist of two stories and a basement, except in the central portion, which consists of one lofty hall open from the main floor to the roof, the height of which will be 90 feet, galleries being placed on the level of the second floor in other parts of the building. Its interior arrangements are, as you will see, different from those in the actual Museum, all the changes having been planned in the light of the experience of nine years' occupation of the present building. It will afford between two and three times as much available space for exhibition and storage under the same area of roof. The fifteen exhibition halls are completely isolated from each other, and may readily be subdivided, when necessary, into smaller rooms. The light will be as good as in the old building, and the ventilation perhaps still better. The sanitary arrangements have been carefully considered.

The necessity for a basement is especially great. In this, place has been provided for many storage rooms and workshops. The existence of a basement will promote the comfort and health of visitors and employees, and by increasing the dryness of the air in the exhibition halls will secure the better preservation of the collections. These proposed changes in the internal arrangements will not interfere with conformity with the other points of the present Museum building in the essential features of exterior proportion. The total capacity of this present building in available floor space is about 100,000 square feet; that of the new building somewhat exceeds 200,000. The present Museum building contains about 80,000 feet of floor space available for exhibition. That proposed will contain about 103,300 square feet for exhibition. The space devoted to offices and laboratories would not be much more, but the area available for exhibition halls, storage rooms, and workshops far greater. The appropriation for the construction of the present building was $250,000.

The estimates of cost on this building vary greatly with regard to details of construction on which I do not here enter further than to say that the whole should be absolutely fireproof throughout, and in view of the further great variation of the cost of building materials within the past two years, I am not prepared to state the sum which would be necessary for its completion. It is certain, however, that $500,000, if not sufficient to complete it, would be all that would be required to be expended during the present year, and I would respectfully represent the desirability of an appropriation of this amount for the purpose in question.

Your attention is directed to certain facts in regard to the character of the materials for the accommodation of which this building is desired. The collections of the Smithsonian Institution and of the Government are especially rich in collections of natural history, which may be grouped in three general classes: The zoological collections, the botanical collections, and the geological collections, including not only all the geological and mineralogical material, but the greater portion of that belonging to paleontology, the study of fossil animals and plants forming an essential part of modern geological work.

Besides the natural history collections, there are equally important anthropological collections which illustrate the history of mankind at all periods and in every land, and which serve to explain the development of all human arts and industries. In everything that relates to the primitive inhabitants of North America, Eskimo as well as Indian, these collections are by far the richest in the world, and with the necessary amount of exhibition space the material on hand will be arranged in a manner which will produce the most impressive and magnificent effect, the educational importance of which can not be overestimated. Again there are collections of considerable extent which illustrate the processes and products of the various arts and industries, as well as what are termed the historical collections, which are of especial interest to a very large number of the visitors to the Museum on account of the associations of the objects exhibited with the personal history of representative men or with important events in the history of America.

The collections illustrating the arts and the art industries are relatively small, and although in themselves of great interest and value, not to be compared in importance with those in natural history and ethnology.

In a letter addressed on June 7, 1888, to the Hon. Justin S. Morrill, and which will be found in a report of June 12 of the same year from the Senate Committee on Public Buildings and Grounds, I made a statement of the rapidity of the recent growth of the Museum, mentioning that in the five years from 1882 to 1887 the number of specimens in the collection have multiplied no less than sixteen times, and endeavored to give an idea, though perhaps an inadequate one, of the extent to which the pressure for want of space was felt. The evil has grown rapidly worse, and, as I have had occasion to mention, it has been felt in the last year in a partial arrest of the growth of the collections, which emphasizes the demand for more room. The present Museum building is not large enough even for the natural history collections alone, a number of which are without any exhibition space whatever. The proposed building will afford accommodations for the ethnological and technological material already on hand and for a large part of the natural history material also. The collections are still increasing, and the number of specimens, as estimated, is now not far from 3,000,000.

Unless more space is soon provided the development of the Government collections will of necessity be almost completely arrested.

So long as there was room for storage, collections not immediately required could be received and packed away for future use. This can not longer be done.

The Armory building, since 1877 assigned to the Museum for storage and workshops, is now entirely occupied by the U. S. Fish Commission, with the exception of four rooms, and by some of the Museum taxidermists, who are now working in very contracted space, and whom it is impossible to accommodate elsewhere.

Increased space in the exhibition halls is needed, the educational value of the collections being seriously diminished by the present crowded system of installation. Still more necessary, however, is room for storage, for rearranging the great reserve collections, for eliminating duplicate material for distribution to college and school museums, and for the use of the taxidermists and preparators engaged in preparing objects for exhibition. Space is also required for the proper handling of the costly outfit of the museum cases and appliances for installation, of which there is always a considerable amount temporarily out of use or in process of construction.

In summarizing what has just been said, it may be stated in general terms that the amount of space already required for exhibition purposes alone, being 207,500 feet as against 100,675 now occupied, and this being exclusive of the 108,900 square feet needed for other objects, the accumulations have now reached such a point of congestion that the actual space needs to be doubled, even independently of future

increase; and I beg to repeat that, unless more space is provided, the development of the Government collection, which is already partly arrested, will be almost completely stopped.

The bill was passed by the Senate as a separate measure on April 5, 1890, and as an amendment to the sundry civil bill for 1891 on July 19. In the House no action was secured, though the bill was favorably reported by the Committee on Public Buildings and Grounds.

The question of placing a basement story under the existing Museum building, which had been under consideration at this time and was referred to the Architect of the Capitol, was reported upon to the House, under date of March 3, 1890, as follows:

ARCHITECT'S OFFICE, UNITED STATES CAPITOL,
Washington, D. C., February 28, 1890.

SIR: In compliance with the requirements of the act providing for the sundry civil expenses of the Government, approved March 2, 1889, I have examined the National Museum, and have estimated the cost of constructing the basement story under that building.

It is thought that the only portion of the basement available for workshops and suitable for storage would be a cellar running around the outer walls of the building and extending inwards 30 feet, so that the rooms thus obtained may have light and air.

These rooms should be roofed with brick arches supported by iron beams. Provision is made in the accompanying estimate to floor with tiles the entire rooms under which these basements come, in part, as the present wooden floors of these rooms are now in bad condition and will soon be unfit for use.

ESTIMATE.

Excavating 6,220 yards of earth, at $1	$6,220
Underpinning front walls, 672 perches, at $7	4,704
Stone masonry, inner walls, 1,248 perches, at $6	7,488
Fireproof flooring (including columns), 1,866 yards, at $5.50	10,263
Marble tiling, 30,400 superficial feet, at 75 cents	22,800
Fifty-six windows, at $25	1,200
Removing and replacing pipes and sewers	3,000
Removing old floors	300
Concrete floors in cellars, 1,866 yards, at 90 cents	1,680
Total	57,675

I will say that by reason of the sewer, steam, and gas pipes running under the present floors the work of constructing these basement rooms, though practicable, will be extremely difficult.

I beg to say that I am of the opinion that a site for a storehouse and for workshops required may be purchased in the neighborhood of the Museum and a fireproof building erected thereon with a capacity as great as these proposed basement rooms for a sum less than will be necessary to construct this basement.

Very respectfully,

EDWARD CLARK,
Architect United States Capitol.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

On January 28, 1891, in view of the possibility of the passage by Congress of a bill for a new building, the Regents—

Resolved, That the executive committee of the Board of Regents, or a majority thereof, and the Secretary be, and they are hereby, authorized and empowered to act for and in the name of the Board of Regents in carrying into effect the provisions of any act of Congress that may be passed providing for the erection of a new building for the United States National Museum.

In the Fifty-second Congress a bill identical with that submitted at the beginning of the previous Congress passed the Senate on April 14, 1892, but in the House it went no further than the Committee on Public Buildings and Grounds. In the Fifty-third Congress the same measure was again introduced, but failed of action.

In all the reports of the Secretary from 1892 down, attention was called to this ever-pressing subject. The exhibition space in both buildings was overfilled. Small specimens could be crowded in here and there, but extensive changes meant that old collections must be sent to storage for the benefit of something more important or of a better class of preparations. Extra storerooms and workrooms were imperative, but they could only be provided by renting outside quarters, with the full understanding that such structures were unsafe, and that collections to the value of hundreds of thousands of dollars might any day be destroyed through the merest accident. Year after year the extent and value of the material thus unsafely housed has been rapidly increasing, and the conditions prevailing have also influenced disadvantageously many owners of valuable and rare specimens, the donation or loan of which could easily have been effected were there a safe place for their installation. It is known that the Museum has been deprived of many large and important accessions from this cause alone.

These circumstances have been explained time and again, but while the arguments presented have excited much interest and have secured the influence of strong and devoted friends, they have never, until within the past two years, obtained the recognition they merit.

The building of galleries in the Museum building, begun in 1897, has afforded slight relief, but the total extent of these additions has increased but little the former area of the two buildings, and in no way lessened the need of a new one.

In the Fifty-fourth Congress Senator Morrill made his final effort toward securing the appropriation so much desired by introducing in the Senate, on December 10, 1895, bill No. 698, which differed but slightly in wording from former measures, except that the cost was reduced from $500,000 to $250,000. It was as follows:

That for an additional fireproof building for the use of the National Museum, 300 feet square, with two stories and a basement, to be erected under the direction of the

Architect of the Capitol, with the approval of the Regents of the Smithsonian Institution, in harmony with the present National Museum building, on the southwestern portion of the grounds of the Smithsonian Institution, there shall be appropriated, out of any moneys in the Treasury not otherwise appropriated, the sum of $250,000; said building to be placed west of the Smithsonian Institution, leaving a roadway between it and the latter of not less than 50 feet, with its north front on a line with the south face of the Agricultural Department and of the Smithsonian Institution, and constructed, as far as practicable, after proper advertisement, by contract or contracts approved by the Secretary of the Treasury and awarded to the lowest responsible bidder; and all expenditures for the purpose herein mentioned shall be audited by the proper officers of the Treasury Department.

This bill was referred to the Committee on Public Buildings and Grounds, but on February 27 following Senator Morrill reported an amendment, which consisted in substituting for the "Architect of the Capitol" the name of Bernard R. Green to have direction of the construction. It was submitted by the committee on March 23, 1896, with a report (No. 540), consisting of material supplied by Secretary Langley and Assistant Secretary Goode. The following, by Mr. Langley, is extracted from his report for 1895:

In my last annual statement I pointed out three conditions which are operating to seriously retard the growth of the National Museum: First, the lack of space for the installation of objects which should be placed on exhibition; second, the unsymmetrical growth of the collection; and, third, the fact that the storage of collections in the wooden sheds south of the Smithsonian building, as well as in the basement of the building itself, is most undesirable and dangerous. The sum of $900, allowed for 1896, will be necessarily expended in the rental of shop and storage room in place of the "Armory building." The actually dangerous wooden sheds must therefore remain occupied until a sum of money is provided which will enable me to discontinue their use altogether by renting other quarters removed entirely from proximity to the Smithsonian building.

The problem of even providing shelter of any kind for the vast amount of material daily received from persons interested in the growth and work of the Museum still remains unsolved. The Institution is placed in an embarrassing position. It has been designated by law as the only depository of collections offered to or made under the auspices of the Government, and can not, under the law, refuse to receive them. The fact remains, however, that when accepted there is no suitable place in which to store them, and no space in the Museum building to exhibit such of the objects as should properly be shown to the public. As I have already pointed out, there is probably no museum in the world in which so small a proportion of the objects worthy of exhibition is visible to the public, or in which the objects exhibited are crowded together so closely. It is now more true than ever that if another museum building as large as the present one were provided it could be at once filled with specimens already on hand.

Following are some of the more important parts of Mr. Goode's statement:

The Smithsonian Institution is the custodian of the National Museum, which is the only lawful place of deposit of "all objects of art and of foreign and curious research, and all objects of natural history, plants, and geological and mineralogical specimens belonging to the United States." The nucleus of the collections consists of the specimens brought home by the Wilkes and other exploring expedi-

tions, but for many years the Museum was supported entirely at the expense of the Smithsonian fund, and a considerable portion of the collections is the property of the Institution.

Professor Huxley defines a museum as "a consultative library of objects." The National Museum is such a consultative library, and it is a great deal more. It is an agency for the instruction of the people of the whole country, and it keeps in mind the needs of persons whose lives are not occupied in the study of science, as well as those of the professional investigator and teacher.

Its benefits are extended without cost or reserve to hundreds of thousands of visitors from all parts of the United States who pass through its doors each year.

It is also accessory to public education through the distribution of the duplicate specimens in the Museum, which are made up into sets, accurately named, and given to public institutions in all parts of the country.

The history of the Museum is divided into three periods: First, that from the foundation of the Smithsonian Institution to 1857, during which time specimens were collected purely and solely to serve as materials for research, no special effort having been made to publicly exhibit them or to utilize them except as a foundation for scientific description and theory. Second, the period from 1857, when the Institution assumed the custody of the "National Cabinet of Curiosities," to 1876. During this period the Museum became a place of deposit for scientific material which had already been studied, this material, so far as practicable, being exhibited to the public, and thus made to serve an educational purpose. Third, the present period, beginning in the year 1876, during which the Museum has entered upon a career of active work in gathering collections and exhibiting them on account of their educational value.

During the first period the main object of the Museum was scientific research; in the second the establishment became a museum of record as well as of research; while in the third period there is growing up also the idea of public education.

The three ideas, record, research, and education, cooperative and mutually helpful as they are, are essential to the development of every great museum. The National Museum endeavors to promote them all.

It is a museum of record, in which are preserved the material foundations of an enormous amount of scientific knowledge, the types of numerous past investigations. This is especially the case with those materials that have served as a foundation for the reports upon the resources of the United States.

It is a museum of research, which aims to make its contents serve in the highest degree as a stimulus to inquiry and a foundation for scientific investigation. Research is necessary in order to identify and group the objects in the most philosophical and instructive relations, and its officers are therefore selected for their ability as investigators as well as their trustworthiness as custodians.

It is an educational museum, through its policy of illustrating by specimens every kind of natural object and every manifestation of human thought and activity, of displaying descriptive labels adapted to the popular mind, and of distributing its publications and its named series of duplicates.

The collections are installed in part in the Smithsonian building and in part in the large building adjacent, covering 2¼ acres of ground, which was erected in 1881 to afford temporary accommodations for the overflow until such time as an adequate new building could be constructed.

The intrinsic value of such collections as these can not well be expressed in figures. There are single specimens worth hundreds, others worth thousands, of dollars, and still others which are unique and priceless. Many series of specimens which owe their value to their completeness and to the labor which has been expended on them can not be replaced at any price. The collections at a forced sale would realize

more than has been expended on them, and a fair appraisal of their value would amount to several millions of dollars.

In the direct purchase of specimens but little money has been spent, less, perhaps, in fifty years than either France, England, Germany, or Austria expends in a single year on similar objects. The entire Museum is the outgrowth of Government expeditions and expositions, and of the gifts prompted by the generosity of the American people.

If there were more space it would be possible to devote a special hall to the collections illustrating the life of the races of the Far North—the Eskimos and their kin. A large hall might be filled with the wonderful groups of models of the races of mankind, and particularly of the different tribes of the North American Indians, clothed in their characteristic costumes and engaged in the arts and occupations peculiar to each. These groups are recognized in Europe as having no equal, and are now temporarily placed in the lecture room and in various out-of-the-way corners where their effect and usefulness are largely lost. No other museum in the world has such rich material in this field, but at present only a small number of exhibition cases can be devoted to them and the remainder of the material is stowed away in drawers and packing boxes.

The magnificent mounted groups of the larger animals of America, unsurpassed by anything of the kind in the world, are now so crowded together in the midst of other collections that they are scarcely visible, and some of them are packed away. The great fossil vertebrate animals of North America, of which there is a magnificent series. A considerable portion of this collection is now stored in the basement of the museum at Yale College for lack of room to receive it here, although it is much needed by the geologists of the Geological Survey for purposes of study.

Another hall is needed which might well be devoted to economic geology, illustrating the wonderful material wealth of our country and its utilization; and still another is needed to illustrate the material resources of the country, classified by States. With the present accommodations the materials and ores of each State are confined to one or two small cases. A hall of proper extent, arranged upon this geographical plan, would be one of the most impressive displays of the kind to be seen anywhere in the world.

The building devoted especially to the Museum was erected after the Centennial Exhibition in Philadelphia as a temporary accommodation for the collections given to the United States by the foreign governments and private exhibitors represented on that occasion. It is the cheapest public building of a permanent character ever erected, having cost only $2.25 a square foot of floor space available for exhibition. The museum buildings in Central Park, New York, have cost from $30 to $40 a square foot.

The building in Washington has served a good purpose, but is deficient in one of the most important particulars; it has no cellars whatever, and very little provision for workshops and laboratories. In consequence of this it has been necessary to use all kinds of devices for storing material which can not be exhibited in the exhibition halls in the bases under the exhibition cases, in small recesses, so ingeniously contrived that their presence is not suspected. It has been necessary to do this, but the result has been to still further increase the crowded condition.

Another disagreeable result is that much noisy work has to be done in the Museum halls in spaces shut off from the public by screens, and that when preparations for exhibitions or unpacking are going on, not only are a portion of the collections closed to the public, but there is a constant and unpleasant noise of hammers.

A temporary relief was secured some years ago by placing the great herbarium, one of the most important collections of American plants in the world, in the custody of the Agricultural Department; but last year the Secretary of Agriculture

found himself unable to longer give these collections house room; and since the building in which they were kept is not fireproof, and the destruction of the collection would be an incalculable loss to science, there was nothing to do but to receive this, and up to the present time a considerable portion of the collection still remains in danger of destruction by fire, at the Department of Agriculture. There is also a large amount of other material which ought to be arranged for public exhibition in a fireproof building which is now in the inflammable wooden structure adjoining the Department of Agriculture, and which the Secretary is desirous of transferring, if accommodation can be found for it.

All the collections of the Geological Survey are stored in this building, and a considerable number of the scientific experts employed by the Survey have office room and accommodations to enable them to study in the Museum building. These accommodations have become absolutely inadequate, and there is no more room to receive the collections which the Director of the Survey deems absolutely necessary to have here in Washington in connection with his investigations of the material wealth of the country.

The crowded condition of the exhibition halls has been dwelt upon, but that of the storage rooms is still more congested. In the basement of the old Smithsonian building, in its towers, and in various small rooms about the new building, there is a space equivalent to perhaps 200,000 cubic feet, crowded to its utmost capacity with boxed material. This material is all carefully recorded, and the location and contents of every box is definitely fixed, so that when necessary any desired object can be referred to; but satisfactory use of the collections is impossible. In one basement room, for instance, : re crowded 50,000 skins of birds, and 50,000 in an adjacent gallery, altogether twelve times as many as are shown in the exhibition hall. So closely are they crowded that it is impossible even to rearrange them, and their study is attended with great difficulty. It is desired to separate from among these the duplicates for distribution to the colleges and schools throughout the country, and an attempt has been made to accomplish this, but it has been found practically impossible.

The great collection of alcoholic fishes (the result in part of the explorations of the Fish Commission), the most extensive in America, and one of the most extensive in the world, is stored in two basement rooms and only accessible with the greatest difficulty. Furthermore, the crowding of such a mass of alcoholic material in a small space is very dangerous, and in case of fire would lead to disastrous results. Properly equipped museums, like the British Museum in London, have a special fireproof building for collections of this kind, separate from other buildings, and provided with special devices for the prevention of fire.

In addition to the storage within the fireproof buildings there are a number of sheds whose capacity is roughly estimated at 170,000 cubic feet, which are packed with valuable material, and in which most of the workshops are placed. Two of these are immediately south of the Smithsonian building, another at the southeast corner of the Museum building, two others to the southwest of the old Armory building, and another, temporarily hired, halfway between the Museum and the Capitol. Until 1888 two floors of the old Armory building were used for the storage of Museum material. It then became necessary to give up one floor to accommodate the increasing necessities of the Fish Commission, and in 1894 to give it up entirely to the Commission. At that time an appropriation was made to rent storage rooms in the city. Suitable storage rooms can not be rented; we have had to move twice and are now being forced to a third move. These moves are destructive and expensive.

The two sheds adjoining the Armory building are getting old and some of the timbers are rotting away. They can not be repaired because there is no place to put the material they contain while the work is being done, and they are so crowded that temporary readjustments for this purpose are not possible.

All of the wooden storage sheds are in constant danger from destruction by fire. This is a matter especially serious in connection with two long sheds near the Smithsonian building. In his report to the Regents, presented to Congress in 1894, Secretary Langley made an earnest appeal for relief in the following words:

"I have the assurance of experts that a fire communicated to these rooms would sweep through the entire length of the building, and although the building itself is fireproof as against any ordinary danger, it may well be doubted whether any of the collections therein exhibited can be regarded as safe if the rooms immediately below should be exposed to so peculiarly severe a conflagration as would be caused by the ignition of these large quantities of inflammable material. Besides this, these wooden sheds, which (as I have already intimated) are used not only for storerooms, but for workshops, for the preservation of specimens, and also as sheds for the carpenters, are likewise liable to cause serious losses should a fire be kindled in any of them, and all of these, I repeat, are immediately under the windows of the Smithsonian building.

"In a report recently submitted by one of the inspectors of the Association of Fire Underwriters, in response to a request from me for a statement as to what insurance rates would be fixed upon the sheds in question, the Smithsonian building is referred to as an undesirable risk, owing solely to the presence of all this inflammable material underneath and in the adjoining sheds, on which latter insurance can not be placed for less than $40 per $1,000. This is, I am informed, nearly ten times the rate which would be charged on an ordinary warehouse. The chief danger, however, is not to the sheds themselves or their contents, but to the adjoining collections, which, without reference to their scientific interest but merely to their intrinsic value, represent a very large sum of money."

The result of all this crowding and lack of facility for work is that what is accomplished for public education by the Museum requires unnecessary and unusual effort, and that the fullest results are not realized from the appropriations which are made for this branch of the public service.

Another result is that the value of the collections, the property of the nation, is not increasing as rapidly as it would otherwise do. The amount of valuable material presented and bequeathed to the Museum is not as great as it seemed likely to be a few years ago. Nothing which is offered is refused, but the authorities of the Museum do not feel at liberty to ask for gifts when they can not assure the givers that they can be suitably cared for; and persons having collections to give, being aware of the lack of room, naturally prefer to place their gifts in institutions where there is room to receive them.

Notwithstanding these hindrances to the Museum's progress, the increment from legitimate sources, especially from the various Departments of the Government, which are required by law to deposit their accumulations here, was during the year 1895 about 127,000 specimens. In 1894 the accessions were more numerous, the total exceeding 171,000. This large increase was in part at least due to the fact that a large number of collections were acquired at the close of the World's Fair in Chicago. These were almost without exception collections which had been prepared by foreign exhibitors with the Smithsonian Institution in mind as the ultimate place of deposit.

It would have been possible to have obtained an immense number of specimens on this occasion, but it was deemed proper to refrain from efforts in this direction, not only because of the considerations just referred to but also on account of the desire of the people of Chicago to retain such objects in their own city as a beginning toward a great civic museum which might serve as a permanent memorial of the World's Columbian Exposition. It has always been the policy of the Smithsonian Institution to encourage the development of such institutions throughout the United States, and to assist in developing them, and on this account many proffers

of specimens were declined, with the recommendation that they be offered to the Chicago museum, and, so far as it was possible to do so, the attention of exhibitors who had collections to dispose of was directed toward that institution.

A census of the number of specimens now contained in the various departments of the Museum shows that the total is about 3,500,000, almost all of which have been acquired by gift, in exchange for other specimens, or as an equivalent for publications.

On April 14, 1896, Senator Morrill proposed his bill (Senate No. 698 as amended) as an amendment to the sundry civil bill for 1897, and it was referred to the Committee on Appropriations. He spoke upon the measure in the Senate on April 16, prefacing his remarks as follows:

Mr. President, when the Smithsonian Institution, designed for "the increase and diffusion of knowledge among men," was put into practical operation, it was discovered that a national museum would be a large contributor to the great purpose of the founder, and that the nation was destitute of such an institution. The Smithsonian building accordingly early began to be temporarily crowded with many gifts and objects of rare value, and subsequently a separate building for a museum was found to be indispensable. Patronized as was this collateral enterprise of the Smithsonian by the Government, through many of its Executive Departments, and guided by the Smithsonian Institution in a scientific and educational direction, as well as in the practical diffusion of knowledge, it was sure to become an important but inexpensive institution of public education, with a constantly increasing collection of important materials worthy to be intrusted to the custody of a national museum, where they might be forever preserved and thus increase in value with every succeeding generation.

His closing words were significant and prophetic:

The additional building now earnestly sought will be equal to the preservation and exhibition of a very large amount of accumulated material now unhappily stored away, and will also provide some space for future accumulations that should not longer be neglected.

The agents of great museums abroad are reported to be regularly employed here, with authority to purchase any American curios and antiquities, and in some directions they are supposed to have already obtained better specimens for exhibition than have been left for us to find.

The New World, of which the United States forms so important a part, in its prairies and mountains, hills and forests, with their extensive minerals, rocks and marbles, lakes and rivers, with the animals, game, birds, and fish, the story of the prehistoric race, the legends of the Indian tribes, as well as the notable modern history and life of the present inhabitants, all seem to have distinctive features of their own which belong almost exclusively to the western half of the globe discovered by Columbus. This vast and comparatively ungathered continental field, with its abounding American treasures, should be harvested by our National Museum and not surrendered to the more diligent foreign explorers to adorn and enrich only European museums.

As long as it shall be conducted by the Smithsonian Institution its broad nonpartisan reputation as a national museum of the highest character will not be likely ever to be disputed or impeached.

While this additional building, with its additional story and cellar, will more than double the capacity of the present museum, it is probable as the years go by that it will be necessary to keep step with the research, progress, and record of the American people, and as early as 1926, when our population will be not less than 140,000,000,

it may be expected that another and grander building in the rear of the Smithsonian, facing on south B street and connecting the two wings, will be required to mark and illustrate the age.

On April 25, 1896, in the absence of Senator Morrill, Senator George Gray, also a Smithsonian Regent, moved the amendment to the sundry civil bill, saying in support of the measure that—

The Senator from Vermont is one of the Regents of the Smithsonian Institution. I also have the honor to be one of that body, and I know something in that way of the necessities for the building provided for in this amendment. There is a large amount of exceedingly valuable scientific material which is housed there in temporary wooden sheds, exposed to the peril of conflagration, and which would entail if it were destroyed incalculable loss, not only upon the Government of the United States, but upon the scientific world. There are matters there now thus insecurely housed that could not be replaced. We all know what a credit the Smithsonian Institution is to the country and to the science of the country. There is no department of the Government that is better conducted, more conscientiously administered in all of its branches, and from which there are so many benefits, direct and indirect, diffusing themselves among all the people of the country.

The amendment was then agreed to by the Senate, but the House disagreed, and on May 21 the Senate receded from its amendment. Although the bill was again introduced in the Senate at the beginning of the second session of the Fifty-fourth Congress (January 23, 1897), the subject obtained no further consideration.

In 1897 several expedients were suggested for the relief of the national collections, none of which had relation to the contemplated new building. In January of that year inquiries made by the House Committee on Appropriations were replied to by Secretary Langley as follows:

I have delayed this reply till I could consult a trustworthy architect as to whether the walls of the Museum building would bear the additional strain if other stories were added. It appears to be his opinion that the cost of enlarging the present structure by additional height would not be warranted by the result, and that the gain in exhibition space would be largely offset by its loss below from the interference with light.

As regards your inquiry about the building known as the Army Medical Museum, I have to say that this is located at the corner of Seventh and B streeets southwest, and covers about 21,000 square feet of ground. The center building on B street is 112 feet in length and 54 feet 8 inches in width, exclusive of ornamental and other projections. It has a basement, and is three full stories in height. A fourth story is over the main entrance on B street. The structure is flanked by two wings on each side, 60 by 131 feet, with basement. The heights of the stories are as follows: Basement, 11 feet; first story, 15 feet; second story, center building, 14 feet, wings, 32 feet; third story, center building, 13 feet; fourth story, center building, extends to the roof. The total floor space, if the floor were completed at the third story, would be nearly 90,000 square feet, including the basement, and though all the building as now arranged is not adapted to museum exhibition purposes, it could be used so as to be a very great help.

At a meeting of the Regents on January 27, 1897, the Secretary announced that he had been asked by the Joint Committee on the

Library what the National Museum had which would serve to decorate the new Library building, whereupon it was resolved—

That in the opinion of the Board of Regents of the Smithsonian Institution it will not be expedient or wise to interfere with the integrity of the National Museum by lending, for the decoration of the Library building, any of the articles or property now in its care.

At a subsequent meeting of the Board, February 1, on the suggestion of Dr. Charles D. Walcott, in his capacity as Director of the U. S. Geological Survey, it was resolved—

That the Board of Regents of the Smithsonian Institution look with favor upon the proposition to establish a museum of practical and industrial geology in the neighborhood of the National Museum.

It has, however, since been arranged that this special feature shall remain a part of the National Museum.

In his report for 1898, as Acting Assistant Secretary in charge of the National Museum, Doctor Walcott discussed as follows the necessity for a new building:

The present National Museum building was erected with the view of covering the largest amount of space with the least outlay of money. In this respect it may be considered a success. It is, in fact, scarcely more than the shadow of such a massive, dignified, and well-finished building as should be the home of the great national collections. There is needed at once a spacious, absolutely fireproof building of several stories, constructed of durable materials, well lighted, modern in equipment and on such a plan that it can be added to as occasion demands in the future. A site for such a building is already owned by the Government; only the building needs to be provided for. What the Capitol building is to the nation, the Library building to the National Library, the Smithsonian building to the Smithsonian Institution, the new museum building should be to the National Museum. * * *

The growth of the U. S. National Musuem was rapid under the successful charge of the late Dr. G. Brown Goode. When the character of the building and the funds available for its maintenance are considered, it compares favorably with any modern museum. It has received large collections from the scientific departments of the Government, and through private contribution (with some additions by purchase and exchange), all of which have been accommodated as well as could be in the inadequate laboratories, storerooms, and exhibition space. The galleries just completed have added 16,000 square feet of floor space, which will help to a certain extent to relieve the crowded condition of the exhibition halls and courts below. As an illustration of the present conditions and the necessity for more room, attention is called to the anthropological collections, which illustrate the development and progress of man and his works. If the material now in the possession of the Government in this department should be properly placed on exhibition, it would occupy the entire space in the present Museum building. The great collections in zoology, botany, economic geology, general geology, and paleontology should be entirely removed and placed in a building properly constructed for their study and exhibition.

In the present building there is a great deficiency in laboratory facilities. Curators and assistants are hampered for want of room in which to lay out, arrange, classify, mount, and label specimens. There should also be rooms in which students could bring together and compare various series of objects, and have at hand books and scientific apparatus. The present Museum building contains a few rooms suita-

ble for the purposes mentioned, but the majority have to be used as storerooms, laboratories, and offices, and are therefore too much crowded to serve in any one of these capacities. Owing to the pressure for space, courts, halls, and galleries intended for exhibition purposes, both in the Smithsonian building and in the Museum building, are unavoidably occupied to a considerable extent as laboratories and storerooms. This lack of laboratory space is extremely detrimental to the interests of the Museum.

Beyond six small basement rooms under two of the corner pavilions the present building has absolutely no provision in the way of basement or other rooms for the storage of collections which come in from day to day from Government field collectors or private donors, or such as are separated for distribution or held for the use of students. To remedy this defect many expedients have necessarily been resorted to, such as placing storage cases (faced with mahogany to make them presentable) in the exhibition halls, hiring storage rooms in private buildings, and filling up offices, entrances, staircase landings, and passageways not absolutely indispensable. The ingenuity which has been exercised in this direction by some of the curators is very great, and the annoyances that are daily endured in the interest of preserving the collections deserve notice. What is needed is a series of spacious fireproof basements for the less perishable objects, the collections preserved in alcohol, and the ordinary stores and tools, and equally spacious dry lofts and rooms for those collections and stores which require protection from dampness.

The present Museum building, though large in extent, is overcrowded. It was built with the cheapest materials and under the cheapest system of construction. Its lack of architectural dignity and the indifferent character of the materials of which it is constructed give it the appearance of a temporary structure and tend to cheapen the effect of the really good cases and the very valuable collections which it contains. The visitor is everywhere confronted with rough walls, unfinished ceilings, and obtrusive trusses and supports. It should also be remembered that a considerable portion of the collections are still in the Smithsonian building, where the crowding is scarcely less than in the Museum building.

The following are probably the last published remarks by Senator Morrill on the subject to which so much of his energy had been given. They were made at a meeting of the Board of Regents on January 26, 1898:

As some of you know, I have been urging a new Museum building for about ten years. The bills I have introduced have passed through the Senate several times, but never through the House. I may say now that I shall not live long enough to get the measure completed. It was heretofore contemplated that there should be a Museum building on the west of the Smithsonian building, in a position corresponding with the present Museum building, and these two were to be connected by a building on B street, thus making the largest museum in the country. I have now about decided to abandon that plan and try to secure the building on B street first. I merely state this in order to ascertain whether the change of plan is favored by the Board of Regents.

The suggestion was adopted by the Board, but was subsequently abandoned when the present plans were started.

The report upon the U. S. National Museum for 1901 contains the following condensed account of the condition and requirements of the collections, by the present assistant secretary in charge:

Attention has repeatedly been called to the inadequacy of the present accommodations for the national collections. The Smithsonian building had become fully

occupied some twenty-five years ago, when the large contributions to the Government from exhibitors at the Philadelphia Centennial Exhibition led to the erection of the Museum building, completed in 1881. By 1883 this structure was also filled, and though numerous efforts have since been made to secure more ample quarters, all have met with failure. In 1888, 1890, and 1892 the Senate voted $500,000 for a new building, and in 1896, $250,000, but none of these measures was even considered in the House of Representatives.

There has been no abatement in the number of collections received annually, but in fact a general increase from year to year, and a severe task has thus devolved upon the Museum authorities in arranging for their disposition. New specimens have constantly been added to the exhibition halls and storage rooms until both are overcrowded to the extent that in the one the objects, as a rule, can not be properly viewed by visitors, and in the other their classification has become impossible, and they are for the most part practically inaccessible for study. But so extensive have been the accessions that only a part could be disposed of in this manner, and it became necessary, several years ago, to resort to outside storage, which is now provided for in an old wooden shed upon the Mall and in several rented buildings. None of these buildings is of fireproof construction, though they contain collections of great value and in large part not replaceable. They also lack facilities for the classification and arrangement of the specimens, which are packed away in shipping boxes, and for the time serve no purpose of any kind.

The collections made by the Government surveys, of which the Museum is the legal custodian, can continue to be received and housed, as additional storage buildings may be leased, if necessary, though the further provision of the law to make them at all times available for study and examination can no longer be carried out. The same applies to specimens obtained by purchase or exchange and to such donations as are given without condition. The Museum is in fact being resolved into a mere storehouse of material which comes to it mainly without solicitation, and its larger purpose, while never lost sight of, is becoming more and more difficult to maintain. Its reserve or record collections in every branch should be so systematically arranged that any specimens desired for study could immediately be found; the public exhibition should comprise the entire range of Museum subjects, and be installed effectively and without crowding, and there should be ample and well-appointed working quarters, in which all the activities of the establishment could be conveniently carried on.

With the conditions as they now are, it is not to be wondered at that the National Museum lacks that character of support which has done so much for many other museums. Its donations are generally small and relatively unimportant. The possessors of large and valuable collections will not present them where they can not be at once displayed or well arranged. Such inducements can now rarely be offered here, but many of the larger museums elsewhere owe their principal growth to generous gifts from wealthy patrons of science and the arts. Specific mention could be made of several large collections which their owners would have preferred to place at the national capital, but which have been given to or deposited in other museums, because in Washington they would have to be packed away for an indefinite period, at great risk of injury and destruction.

The amount of floor space occupied by the national collections is very much smaller than would appear to the casual visitor. The two main buildings contain, in fact, only 195,486 square feet, to which the outside buildings, mostly rented, add 43,203 square feet, making a total of 238,689 square feet. The latter are partly occupied by workshops, but are mainly used for the gross storage of specimens, and in no case for exhibition or for the arrangement in classified order of the reserve series.

In London the subjects represented by the United States National Museum are distributed among several museums, such as the British Museum, leaving out the

Library, the Victoria and Albert Museum, and the Museum of Practical Geology, which now have an aggregate of 989,388 square feet of floor space, soon to be increased by 400,000 or 500,000 square feet in the new addition to the Victoria and Albert Museum. In Berlin seven of the national museums relating to natural history and the industrial arts possess some 575,000 square feet of area, and the new National History Museum of Vienna has over 350,000 square feet alone. In our own country, the American Museum of Natural History in New York City, which, when completed, will cover a ground area of over 5½ acres, already has 356,800 square feet of floor space available.

A study of the conditions in Washington has shown that to properly arrange the national collections and provide for the growth of perhaps fifteen or twenty years would require additional floor space to the extent of something like 400,000 or 500,000 square feet. If this were obtained through the construction of a new building having that amount of room, it would still be necessary to utilize both of the present buildings, and this seems the preferable course to pursue.

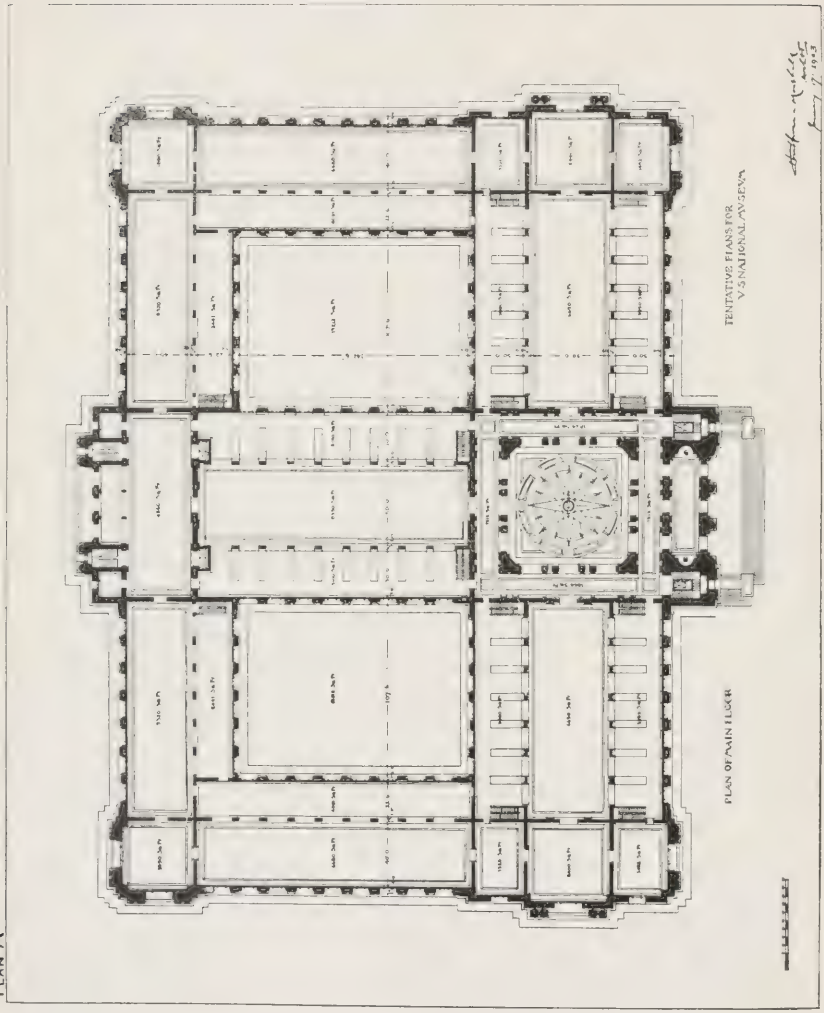
The efforts of Senator Morrill, though so persistent and well directed, were not to bear their fruit, as he himself had intimated, until after his lamented death, and, in fact, there was to be a lapse of five years before the culmination of his wishes was definitely assured. His large share in the final result must not be forgotten. Four times did he secure a majority vote in the Senate, and his influence in the House is shown by the favorable consideration given his bills by the committees to which they were referred. His part, it is now recognized, was in the direction of educating, of impressing upon Congress the needs of the national collections, which he did by keeping the subject continually alive for over ten years, through the frequent introduction of bills, the presentation of reports in which the requirements of the Museum were set forth in detail, and his own impressive remarks upon the floor. It came, therefore, to be not a question of whether the Museum should have additional and more worthy quarters, but rather one of finance; could the necessary funds, in the opinion of Congress, be granted for the purpose?

Accordingly, the following request, which appeared in the Book of Estimates for 1903, occasioned no surprise:

Plans for additional fireproof building, National Museum: For the preparation, under the direction of the Secretary of the Smithsonian Institution, of preliminary plans for an additional fireproof building for the United States National Museum, to be erected on the Mall between Ninth and Twelfth streets west, including the expense of collecting necessary data, said plans and such recommendations thereon as the Secretary of the Smithsonian Institution may deem necessary to be transmitted to Congress at its next regular session, five thousand dollars, to be immediately available.

Note accompanying estimate.—In 1879 Congress appropriated $250,000 for the erection of a building to meet the urgent needs of the National Museum. The structure then put up, and completed within the appropriation, was practically only a large storehouse, with few of the facilities demanded by a large museum, and was at the time expected to fill but a temporary want. It has in fact, however, been made to serve a most useful purpose and should continue so to do, but its accommodations have in all respects been long outgrown. By 1885 its exhibition halls and storage

PLAN A



TENTATIVE FLOOR PLAN (A) FOR THE NEW BUILDING FOR THE NATIONAL MUSEUM, SUBMITTED TO CONGRESS ON JANUARY 23, 1903.

rooms were already filled; by 1890 they were in a congested condition. Since then it has been necessary to lease temporary quarters for the incoming collections, these quarters being increased from year to year until they now hold as much in quantity as the Museum building itself. In these places the collections are in constant danger from fire, and being stored in packing cases, are subject to deterioration.

The National Museum is constantly in receipt of large and important collections from private sources, which add to its wealth of treasures. The collections are mainly, however, the product of the Government surveys, obtained at great cost and constituting the material records of all national explorations. They are, therefore, practically not replaceable. All collections from these sources were by Congressional acts of 1846 and 1879 committed to the custody of the Smithsonian Institution, with provision for their scientific classification and arrangement. Under the conditions existing it becomes impossible to carry out either the spirit or the letter of the law. It is recommended that the sum of $5,000 be appropriated for the preparation of plans for a new Museum building.

Certain tentative sketch plans had previously been prepared, in order to indicate to the Regents the general style and approximate size of a building which it was thought would best meet the requirements. The cost of such a building in stone was estimated at from $5,000,000 to $6,000,000. The matter was discussed with the Committees on Appropriations of both Houses of Congress, the Secretary and others appearing before them in support of the measure. A definite sum for the cost of the building had not been fixed, nor were the tentative plans considered as entirely appropriate to be followed. It was explained that the amount named in the estimate was required to permit of a more careful study of the conditions, and that the plans to be prepared would embody only the actual needs. The item was not reported by the House committee, but passed the Senate with a clause limiting the cost of the building to $2,500,000. In conference, however, this limit was reduced to $1,500,000, the bill as passed, in connection with the sundry civil act for 1903, being as follows:

Plans for additional building, National Museum: For the preparation, under the direction of the Secretary of the Smithsonian Institution, of preliminary plans for an additional fireproof steel-frame brick and terra cotta building, to cost not exceeding one million five hundred thousand dollars, for the United States National Museum, to be erected, when appropriated for, on the Mall, between Ninth and Twelfth streets west, said plans when completed to be transmitted by the Secretary of the Smithsonian Institution to Congress, five thousand dollars.

The preliminary plans called for by the above act were completed during the following winter and on January 22, 1903, they were presented, together with an explanatory report, to a special committee of the Board of Regents, appointed the previous year, "to represent to Congress the pressing necessity of additional room for the proper exhibition of specimens belonging to the National Museum." This committee, consisting of the six Congressional Regents, namely, Senators O. H. Platt, S. M. Cullom, and F. M. Cockrell, and Representatives R. R. Hitt, Robert Adams, jr., and Hugh A. Dinsmore, after

a full discussion, passed the following resolution, which was subsequently transmitted to Congress:

That under the limitations of the law the committee hereby report to Congress Plan B for a new National Museum building as the best obtainable for the amount mentioned; but in the judgment of the committee the larger plan, A, is believed to be the one which should be adopted, and we therefore ask that Congress shall make the appropriation for it instead of for the smaller plan.

On January 23, 1903, the plans and report were transmitted to Congress and printed as Document No. 314, House of Representatives, Fifty-seventh Congress, second session. The arguments presented in the report have practically all been set forth in previous pages of this paper, and therefore only such extracts need be quoted here as relate to the plans and to the questions directly concerning their preparation. Of the plans themselves only two are given, one, marked "A," showing the outlines of the entire building as then designed, the other, marked "B," showing the half of the building, which it was estimated could be erected for the sum of $1,500,000, the limit of cost first established. Following are the extracts from the report prepared by the assistant secretary in charge of the Museum:

The plan contemplates a rectangular building about 486 feet front by about 345 feet deep and about 80 feet high including the basement. The building is designed for four floors, and will afford about 400,000 square feet of floor space, the first and second floors to be used for exhibition, the basement and upper floor for storage, workrooms, and other purposes necessary to the conduct of a museum. It could be erected in substantial form as a fireproof building for a sum not exceeding $3,000,000.

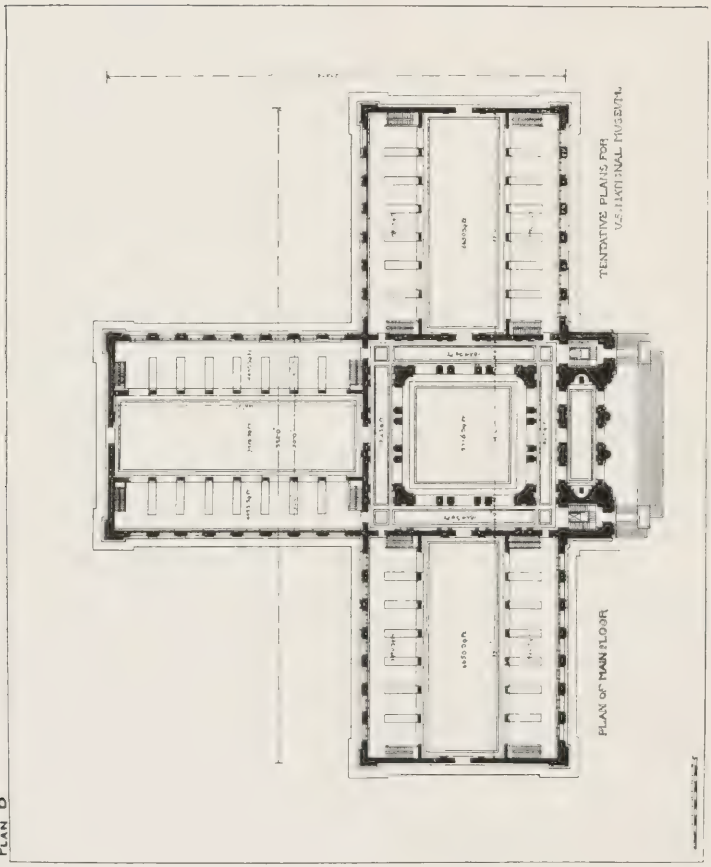
The plan has been designed in such a manner that approximately one-half of the building could be constructed at once, presenting the appearance of a completed building and suitable for the Museum needs. This half would consist of the main or south wing and the middle wing, and is exhibited in a separate drawing. Whilst it would in no way provide for the growth of the Museum, it would relieve the present congested condition of the exhibition halls, render possible a proper classification of the reserve collections, and remove the necessity of employing any rented buildings.

The plan of the building has been drawn after a study of all important existing museums, both in this country and abroad, and embodies their useful features and avoids defects which have been revealed in the course of time. It is expected that, should this building be authorized, it would be superior for museum purposes to any building in this country or abroad, and it is respectfully recommended that the sum of $1,500,000 be appropriated for the construction of substantially so much of the building as is exhibited in Plan B.

* * * * * * *

The National Museum occupies the building erected for its use in 1881, the greater part of the Smithsonian building, parts of three detached buildings on the Mall, and several rented buildings south of B street SW. The area represented, together with the general use to which the several floors of the larger buildings and each of the smaller buildings are devoted, is shown in the following table:

	Square feet.
Smithsonian building:	
Basement (mainly storage and heating plant)	11,778
Ground floor (mainly exhibition halls)	17,372
Second floor (mainly workrooms)	6,587



TENTATIVE FLOOR PLAN (B) FOR THE NEW BUILDING FOR THE NATIONAL MUSEUM, SUBMITTED TO CONGRESS ON JANUARY 23, 1903.

	Square feet.	
Third floor (mainly exhibition)	10,889	
Upper part of north tower (workrooms and storage)	2,617	
East end (offices, shipping rooms, etc.)	2,755	
		51,998
Museum building:		
Ground floor (exhibition)	74,209	
Gallery floor (mainly exhibition)	28,986	
Central towers and pavilions (mainly workrooms, storage, offices, library, etc.)	40,293	
		143,488
Outside buildings:		
Smithsonian stable (taxidermist's workroom)	615	
Frame building on Smithsonian reservation (taxidermist's and 1 mechanical workshop)	1,400	
Frame building on Armory Square (storage of specimens)	7,073	
Buildings at No. 431 Ninth street SW. (rented—storage of specimens and property)	21,129	
Building No. 309 to 313 Tenth street SW. (rented—storage of specimens, preparators' and mechanical workshops)	6,406	
Building No. 217 Seventh street SW. (rented—carpenter shops)	3,655	
Building in rear of 915 Virginia avenue SW. (rented, paint and glass shop)	2,925	
		43,203
Total space now occupied		238,689

The allotments of space by subjects and by departments is as follows:

By subjects:	Square feet.
Exhibition	112,697
Storage of reserve collections, scientific laboratories, and workrooms	75,468
General and miscellaneous purposes, including mechanical workshops and storage, heating plant, library, lecture hall, public comfort, administrative offices, etc	50,524
Total	238,689

By departments:	
Anthropology, including ethnology, archæology, American history, and arts and industries	78,280
Biology, including zoology and botany	72,914
Geology, including division of practical geology	36,971
General and miscellaneous purposes	50,524
Total	238,689

An inspection of the several buildings shows conditions which are exceedingly deplorable for the National Museum of a great country. Every branch is seriously hampered by the total inadequacy of the space assigned it, and the proper disposition of specimens long ago became impossible, with the result that year after year valuable collections, often of large size, have had to be packed away in insecure rented buildings, where they are also inaccessible. While the Museum building is not ill adapted to exhibition purposes, it is much too small to serve the present needs. Its halls are overcrowded, the cases being generally placed so near together that two persons can scarcely pass between them and no effective view of their contents can be obtained. An increase in space of one-half to two-thirds at least would be necessary to properly display the present contents of these halls.

Having practically no basement, the only space available for the reserve storage, workrooms, and offices is the small rooms of the central towers and corner pavilions, except that some of the galleries designed for exhibition have from necessity been turned over to these purposes. In these quarters the specimens are packed almost solidly, in cases generally reaching to such a height as to make access to the upper ones extremely inconvenient. The workers have scarcely room in which to place their tables, and there is little space anywhere for the spreading out of specimens for purposes of study and classification or of preparation for exhibition.

In the Smithsonian building, which was originally designed to be used only in small part for museum purposes, the conditions are similar. There are four exhibition halls, three used for zoology and one for prehistoric archæology. The latter, occupying the entire upper floor of the main building, has, through the loosening and fall of large areas of plaster from the ceiling, been pronounced unsafe and closed to the public until funds can be obtained for its repair and renovation. The large corresponding room on the ground floor has four galleries extending nearly its entire length, which some fifteen years ago were turned into work and storage quarters for several branches of zoology. They are overcrowded with cases and tables and are, moreover, extremely unhealthful places for the assistants stationed there because of the impure air arising from the exhibition floor below.

In the basement is stored the greater part of the valuable alcoholic collection of the Museum, in a series of dark, damp rooms, wholly unsuited to the purpose, and where a great deal of work has to be carried on. The other workrooms and storerooms in the Smithsonian building, besides two or three small ones on the main floor, are in the north tower, which is utilized for these purposes up to the height of the seventh story. It is scarcely necessary to explain that many of these rooms, all of which are very small, are inconvenient of access, and that specimens can be carried to and from them only with difficulty.

Many of the activities of the Museum and much the greater part of its storage have for a long period had to be provided for in outside buildings, partly on the Mall and partly rented at an annual expense of over $4,000. The taxidermists are quartered in the upper part of the Smithsonian stable and in a temporary frame structure back of the Smithsonian building. On Armory square, adjoining the Fish Commission building, is an old, dilapidated wooden shed filled with specimens. On Ninth street SW. there is under lease a large area of land covered with wooden sheds containing an immense amount of valuable collections and much other Museum property. The greater part of the so-called Marsh collection of vertebrate fossils, which has been valued at above $150,000, is still stored in a rented building at Tenth street and Maryland avenue, which also provides space for several preparators' workshops. Two other rented buildings are likewise required to accommodate the extensive carpenter, paint, and glazing shops which are required for the making of furniture and for the repairs about the main buildings.

In order to carry out the purposes for which it exists, the National Museum requires a greatly increased amount of space and that any additional space provided be better adapted to its wants than that now occupied.

For the exhibition collections a connected series of relatively large rooms or halls is needed to permit of the arrangement of the specimens and groups of specimens (many being of considerable size) in such manner as will best adapt them to the comprehension of the public and, by the avoidance of crowding, allow them to be viewed effectively.

The record collections, commonly known as the reserve or study series, comprising the bulk of the material in most departments, while demanding such a convenient disposition as will insure the ready examination of specimens, require relatively less space than the exhibition collections, as they can be much more compactly arranged

in drawers and on shelves. Yet their extent is so great that the question of their accommodation is one of the most important ones for consideration. They have been mainly derived from the Government surveys of the past sixty years and represent a very large expenditure of public money.

For the activities of the Museum are needed many well-lighted and well-appointed rooms to serve as laboratories for classifying collections and for scientific research and as workshops for the preparation of specimens for study and for exhibition. It should be noted in this connection that the Museum is called upon to furnish workrooms for several of the scientific bureaus, whose collections are partly studied there, and that, by a recent act of Congress, it is incumbent upon the Museum to provide facilities for such students and investigators from any part of the country as may choose to visit it for purposes of research.

Finally, space must be provided for certain general and miscellaneous purposes, such as the mechanical workshops and storerooms, the heating plant, public-comfort rooms, the library, a lecture hall, the administrative offices, etc.

An estimate of the amount of space needed has been reached by a careful consideration of the several requirements as set forth below, namely:

(1) To relieve the present very congested condition of the exhibition halls.

(2) To provide for the display of objects now in storage which are suitable and intended for public exhibition.

(3) Convenient and systematic storage for the vast reserve or record collections, which are now for the most part inaccessible for examination.

(4) Suitable scientific laboratories, preparators' workshops, etc.

(5) The mechanical workshops required in making repairs to buildings and in the construction and repair of cases and other furniture and fixtures.

(6) Offices necessary for administrative and other purposes common to all the branches of the Museum.

(7) The space required for the heating plant, the library, a lecture hall, public-comfort rooms, and other miscellaneous purposes.

(8) Provision for future growth. The limitation of cost fixed by the sundry civil appropriation act of June 28, 1902, prevents the carrying out of any extravagant views in this regard; and if the building erected have only the area contemplated by the plans submitted the National Museum will again be crowded and in need of room certainly before the end of another ten years and probably of five years.

The growth of the Museum for a number of years past has been mainly through the receipt of material which by law it must receive and care for. The amount of material declined or diverted elsewhere during the last ten or fifteen years because of the lack of room would have occupied a very large proportion of the present exhibition space and have greatly increased the money value of the collections. The same conditions have prevented the Museum authorities from soliciting large contributions, but with adequate facilities many extensive exhibits can be had for the asking. The department of arts and industries, the more practical side of the Museum, has perhaps suffered most from the lack of accommodations. Large exhibits have had to be removed to storage, and the growth of this most important and striking branch was necessarily stopped some time ago. It should be made here, as it has been in all the larger capitals of the world, one of the most important features of the national collections, and its increase, once stimulated, would go forward rapidly and at relatively small expense, as generous donations might be expected from all quarters.

Using the above topics as a basis for calculations, the amount of space immediately required has been worked out for each of the departments. This information is summarized in the following table, which gives also for each subject the space now occupied. With regard to the present storage areas, it should be borne in mind

that much of the material is now compactly stored in packing boxes, and if transferred to classified storage would spread out over many times the space. The departments named are those under which the Museum is classified for convenience of administration.

Subject.	Space now occupied.	Space required.
	Sq. feet.	*Sq. feet.*
Exhibition space:		
Department of anthropology, including ethnology, archæology, American history, and arts and industries	58,790	184,000
Department of biology, including zoology and botany	34,005	95,000
Department of geology, including museum of practical geology	19,902	74,000
Laboratories, workrooms, and storage:		
Department of anthropology	19,490	81,000
Department of biology	38,909	110,000
Department of geology	17,069	46,000
General and miscellaneous:		
Administrative offices, record files, etc	6,506	12,000
Mechanical workshops	8,789	15,000
Mechanical and miscellaneous storage	12,032	22,000
Library, photographic laboratory, lecture hall, restaurant, public comfort, heating and electrical plant, etc	19,056	31,000
Entrances, hallways, etc	4,141	.....
Total	238,689	670,000

With regard to the space now occupied, there are certain areas which, for various reasons, should be abandoned, namely:

	Square feet.
Rented buildings (area)	34,115
Outside buildings on the Smithsonian reservation and Armory square, which have been used only as temporary expedients and are for the most part insecure structures (area)	9,088
Space used for storage and some other purposes in the basement, in the upper part of the north tower, and at the east end of the Smithsonian building, being partly unsuitable and partly inaccessible (area)	12,885
Total	56,088

Deducting this area from the total area now occupied (238,689 square feet) leaves 182,601 square feet as the amount of space now actually available and appropriate for the future needs of the Museum. Again, deducting this amount from the total space named above as required for the Museum (670,000 square feet) leaves approximately 487,000 square feet to be provided for in a new building. The sum named in the sundry civil act of June 28, 1902 ($1,500,000) as the limit of cost for the proposed new building will not, however, permit of the erection by any method of construction of a building having that amount of space.

Several plans have been drawn in an effort to reconcile the needs of the Museum with the limitation of cost proposed by Congress, but none successfully. The last plan, contemplating the smallest size of building that it has been judged advisable to recommend, is the one herewith presented. It represents a rectangular building, having a frontage of about 486 feet, a depth of about 345 feet, not including projections, and a height above the ground at the front of about 70 feet. There will be two open courts. The building is designed to have four floors, inclusive of the basement (which will underlie the entire structure), and will afford about 400,000 square feet of floor space. The first and second floors are intended to be used for

the public exhibition collections and the basement and upper floor for the reserve or record collections, workrooms, offices, and other general and miscellaneous purposes. This is an approximately equal division of the space between the public halls and the other requirements of the Museum. The plan shows entire simplicity of design, and has been drawn with reference to the use of brick and terra cotta in the construction of the outer faces, although stone could be substituted for these materials if so ordered.

The interior arrangement above the basement is a combination of large and small halls, the three largest halls being lighted from above and having two series of galleries of sufficient width to permit of their being screened off and made into series of separate rooms for exhibition and other purposes. This arrangement has been adopted as practically furnishing the largest possible amount of well-lighted floor space in a building of the size proposed, and as presenting many other important advantages. It is felt that a building put up on these lines would in many, if not in all, respects prove superior for museum purposes to those of any existing museums, either at home or abroad.

The cost of erecting a building in accordance with the plan submitted in a most simple though substantial manner has been estimated at about $3,000,000. The plan has been so designed, however, that approximately one-half the building can be constructed separately, with practically the appearance of a completed building and suited to the different kinds of museum requirements. This half would consist of the main or south wing and the middle wing, as represented in a separate drawing. While this part would not provide for future growth, it would relieve the present congested condition of the Museum, make outside storage unnecessary, and render possible a safe disposition and essentially convenient arrangement of the present collections.

This half section of the building as planned could be erected for $1,500,000.

At the hearing before the House Committee on Appropriations, on January 23, 1903, the question of legislation for the new building was thoroughly discussed. It was not doubted that half the building could be erected within the limit of $1,500,000 fixed by the act of the previous year, and the entire building for not exceeding $3,000,000, but in either case the fronts would require to be constructed of brick and terra cotta. There was no objection to the use of these materials on the score of durability, but in view of the large size of the building, its conspicuous position, and the fact that it would be expected to rank among the prominent public structures at the capital, it was urged upon the committee that stone fronts would produce a more dignified effect, and that the change in this respect would not add extravagantly to the cost of the building. Estimates showed, in fact, that if stone were employed the entire building could be erected within the sum of $3,500,000, and one-half the building within $1,625,000.

The matter was not reported to the House in any form, but in the Senate the granting of the full sum was favorably considered, and the bill as there passed was finally agreed to in conference as an item in the sundry civil act for the year ending June 30, 1904. It is as follows:

Building for National Museum: To enable the Regents of the Smithsonian Institution to commence the erection of a suitable fireproof building with granite fronts, for the use of the National Museum, to be erected on the north side of the Mall, between

Ninth and Twelfth streets northwest, substantially in accordance with the Plan A, prepared and submitted to Congress by the Secretary of the Smithsonian Institution under the provisions of the act approved June twenty-eighth, nineteen hundred and two, two hundred and fifty thousand dollars. Said building complete, including heating and ventilating apparatus and elevators, shall cost not to exceed three million five hundred thousand dollars, and a contract or contracts for its completion is hereby authorized to be entered into subject to appropriations to be made by Congress. The construction shall be in charge of Bernard R. Green, Superintendent of Buildings and Grounds, Library of Congress, who shall make the contracts herein authorized and disburse all appropriations made for the work, and shall receive as full compensation for his services hereunder the sum of two thousand dollars annually in addition to his present salary, to be paid out of said appropriations.

At a meeting of the Board of Regents on March 12, 1903, the passage of the above act was announced, and it was resolved:

That the Secretary, with the advice and consent of the chancellor and the chairman of the executive committee, be authorized to represent the Board of Regents so far as may be necessary in consultation with Bernard R. Green, to whom the construction and contracts for the new Museum building are committed by Congress in the act making an appropriation for that purpose.

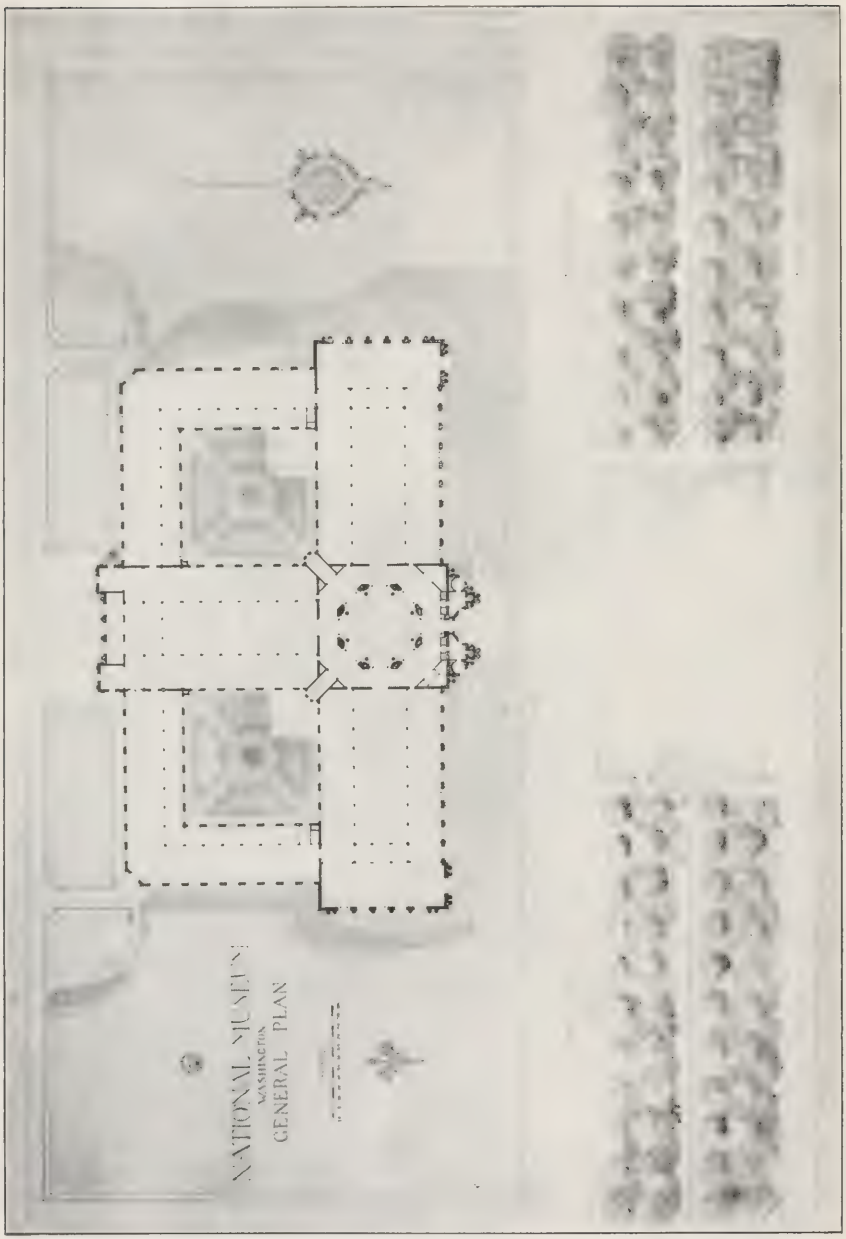
Some little time was consumed in the preliminary arrangements, which included the selection of Messrs. Hornblower & Marshall, of Washington, as the architects of the building. They had made the first tentative sketches and the preliminary plans previously mentioned, and it may also be said that for a number of years they have acted for the Smithsonian Institution and National Museum in all matters requiring architectural advice. They have likewise recently visited many of the prominent museums of Europe, which has given them an invaluable experience in museum requirements.

At the time of writing the general plans, showing the several floors and façades, are nearing completion.

DESCRIPTION.

It is impossible at the present time to describe more than the leading features of this structure, since, though work upon the foundation has begun, the plans are not entirely completed. The building will be rectangular in shape, and faced with granite on all sides. It will have a length of 551 feet, a width of 318 feet, exclusive of projections, and a height of stonework above the basement floor of 77 feet. There will be four stories including the basement, which, beginning above the level of the adjoining street, will be well lighted and entirely available for use. The main and second stories will contain the exhibition collections, while the basement and upper story will be allotted to the many other requirements of a large museum.

In a general way it may be said that the building will consist primarily of a main part in the shape of a broad T, comprising three wide wings or sections diverging at right angles from a large rotunda at the southern or principal entrance. Ranges of narrower width,



FLOOR PLAN OF THE NEW BUILDING FOR THE NATIONAL MUSEUM, WITH APPROACHES AND SURROUNDINGS.

one on each side and two at the north, will connect the three ends of the T or main sections so as to inclose two large open courts (each 128 feet square), and thus complete the quadrangle. The two south sections, which, with the rotunda, comprise the front part of the building, will project slightly at each end beyond the walls of the side ranges.

The new structure will be located on the north side of the Mall, in the so-called Smithsonian Park, about midway between Ninth and Twelfth streets, directly in front of the Smithsonian building, and with its center, like that of the latter, on the axis of Tenth street. While the main front and entrance will face southward, or toward the middle of the park, there will also be a commodious entrance by way of the basement on the north, as an approach from Tenth street. The northern façade will be about 78 feet from the sidewalk of B street north, while the central projection thereof, containing the entrance, will reach about 25 feet nearer to the street.

As the land rises rapidly southward from B street, it has been planned to have the basement floor slightly above the level of that street, but at the south the top of the basement will be nearly on a level with the ground. Suitable embankments will be built along the sides of the building, inclosing a broad area, which will also extend along the south front, thus making the basement equivalent to a full story for at least workroom, laboratory, storage, and heating purposes. Its height will be 14 feet.

The first and second stories, intended for the public, will be 20 feet and 19 feet 5 inches high, respectively. The windows will measure 14 feet 9 inches high in the first and 12 feet high in the second, the corresponding ones in the two stories occupying the same embrasure, though separated by ornamental metal work. These windows will be about 11½ feet wide, and the intervening wall space about 7 feet wide, giving a unit for the installation of exhibits of 18 feet 6 inches.

The third story will be 12 feet in height, with windows about 7 feet high by 5 feet 3 inches wide, thus furnishing ample light for all the requirements of the laboratories and storerooms. In the three main sections of the building there will be still another low story above the last, suitable for the storage of dried specimens.

The relatively small amount appropriated for this large building has demanded simplicity of design and the omission of all extravagant decoration. The lines and proportions have been so well planned, however, that the structure can not fail to be one of great dignity and beauty and a worthy addition to the public buildings in Washington. The granite will be laid in ashlar courses, but the entrances will be worked up with a certain amount of elaborateness. A metal dome, with skylight, will cover the rotunda, and there will also be skylights along the main roofs for lighting the large halls.

The rotunda at the south, or main, entrance will be about 116 feet square, and lighted entirely from above. It will connect directly with the three great halls, which are to be similar in character and of the same length and width, about 209 by 116 feet, all provided with galleries except at the inner ends adjoining the rotunda. The galleries along the sides will be 32 feet wide, leaving an interspace of 50 feet width. This central or open part of the main halls will be 148 feet long and reach to ceiling lights under the skylights, a distance of 60 feet, while the galleries and sides of the first story will receive their light from the large windows of the fronts and courts. The galleries of the second and third floors are intended to be entirely screened off from the central halls and treated as space that can be divided to suit the requirements. The space under the galleries may be treated in the same way or left open, as circumstances may dictate.

The remainder of the building, consisting of the ranges on the east, west, and north, will be 55 feet in interior width and have solid floors, one above the other, their light being entirely obtained from windows.

The main and second floors will, as before stated, be used wholly for the public exhibition collections, while the upper floor will be divided into laboratories and storage rooms for the reserve collections. The basement will have the same dimensions as the first floor, but under the main halls it will require to be lighted artificially. The side areas will be of sufficient width for teams, which may enter the building at both ends of the south front. One of the south wings of the basement will be utilized for the boilers, power plant, mechanical workshops, etc.; the other, as well as the ranges, probably for laboratories and for the storage of specimens in such lines as can best be accommodated there, though some parts of the ranges may be availed of for exhibition purposes.

The northern entrance will be by way of the basement, into a large vestibule with elevators and stairways. There will also be passageways leading in all three directions, the central one communicating directly with a small lecture hall occupying the center of the middle section of the basement. On each side of this hall will be a series of small rooms, some of which can be used for committee meetings.

The net floor area of the building will be about 411,374 square feet, or about 9.44 acres, subdivided as follows: Basement and main floor, each about 116,732 square feet; second and third floors, each about 88,955 square feet.

FLOOR SPACE OCCUPIED BY THE NATIONAL MUSEUM.

The following is a detailed statement of the space occupied by the Museum on January 1, 1904, arranged mainly in explanation of the plans of the two principal existing buildings (Plates 24 and 29). Figures are also given for the outside buildings, but the plans for these are omitted as being unimportant.

National Museum Building.

EXHIBITION HALLS AND GALLERIES.[a]

North hall.

		Square feet
American history (102 feet 6 inches by 62 feet 4 inches)		6,388

East hall.

Floor: Technology (102 feet 2 inches by 62 feet 4 inches)	6,368	
North gallery: Materia medica (75 feet 6 inches by 14 feet)	1,057	
East gallery: Herbarium (38 feet by 7 feet 6 inches)	282	
South gallery: Herbarium (86 feet 6 inches by 13 feet 6 inches)	1,166	
		8,873

South hall.

Floor: Mammals (102 feet 1 inch by 62 feet 5 inches)	6,371	
Galleries: Mammals (212 feet 8 inches by 14 feet; 17 feet 3 inches by 11 feet)	3,169	
		9,540

West hall.

Floor: Ethnology, Eastern Hemisphere (102 feet 6 inches by 62 feet 4 inches)	6,388	
North gallery: Ethnology, Indo-Pacific region (86 feet 9 inches by 13 feet 9 inches)	1,194	
South gallery: Historic religions (86 feet 9 inches by 13 feet 9 inches)	1,194	
West gallery: Historic religions	301	
		9,077

Rotunda.

Floor: American history	2,516	
Galleries: Miscellaneous	600	
		3,116

Northeast court.

Floor: Graphic arts (63 feet 1.5 inches by 62 feet 3 inches)	3,929	
Galleries: Ceramics (209 feet 9 inches by 10 feet 3 inches)	2,150	
		6,079

Southeast court.

Floor: Fossil vertebrates (63 feet 1 inch by 63 feet 1 inch)	3,979	
North and east galleries: Fossil invertebrates (105 feet 8 inches by 10 feet 3 inches)	1,083	
South and west galleries: Fossil plants (105 feet 8 inches by 10 feet 3 inches)	1,083	
		6,145

Southwest court.

Floor: Applied geology (63 feet 1 inch by 63 feet 1 inch)	3,979	
Gallery: Applied geology (211 feet 4 inches by 10 feet 3 inches)	2,166	
		6,145

Northwest court.

Floor: Ethnology, Pueblo tribes (63 feet 2 inches by 62 feet 3 inches)	3,931	
Gallery: Ethnology, Central and South America, Philippine Islands; basketry (209 feet 10 inches by 10 feet 3 inches)	2,151	
		6,082

East-north range.

Lecture hall (89 feet 4 inches by 49 feet 7 inches)		4,429

[a] Partly used for classified storage and laboratory purposes, as noted.

Northeast range.

		Square feet.
Floor: Water transportation (63 feet 2 inches by 49 feet 10 inches)		3,148

Southeast range.

Floor: Reptiles and fishes (63 feet 1 inch by 49 feet 11 inches)	3,149	
Second floor: Herbarium (63 feet 1 inch by 19 feet 6 inches)	1,230	
Second floor: Biological survey, mammal storage (63 feet 1 inch by 30 feet 5 inches)	1,918	
		6,297

East-south range.

Floor: Comparative anatomy (89 feet 6 inches by 49 feet 10 inches)	4,463	
Gallery: Storage, fossil vertebrates and invertebrates (1,394 feet), insects (598 feet), (165 feet 2 inches by 12 feet)	1,992	
		6,455

West-south range.

Floor: Systematic geology (89 feet 6 inches by 49 feet 10 inches)	4,463	
Gallery: Storage, geology (598 feet), paleobotany (1,394 feet), (165 feet 2 inches by 12 feet)	1,992	
		6,455

Southwest range.

Floor: Minerals and gems (63 feet 1 inch by 49 feet 11 inches)	3,149	
South gallery: Minerals, storage (37 feet 11 inches by 12 feet)	455	
North and east galleries: Anthropological laboratory (101 feet by 12 feet)	1,212	
		4,816

Northwest range.

Floor: Ethnology, Eskimo and Northwest coast tribes (63 feet 2 inches by 49 feet 10 inches)	3,147	
Gallery: Library (49 feet 10 inches by 12 feet 3 inches)	610	
		3,757

West-north range.

Floor: Ethnology, Eastern and Great Plains tribes (89 feet by 49 feet 7 inches)	4,412	
South and west galleries: Library (114 feet 5 inches by 12 feet 1 inch)	1,383	
East gallery: History, storage (49 feet 7 inches by 12 feet 1 inch)	598	
		6,393
Total floor and gallery space		103,195

TOWERS AND PAVILIONS.

North tower.

First floor:		
Main entrance (25 feet 8 inches by 13 feet)	334	
Superintendence, two offices	527	
Property office	250	
Captain of the watch	133	
Stairway	126	
Second floor:		
Editorial offices	404	
Biological survey, bird storage	860	
Third floor:		
Coins and medals	129	
Telephone exchange	129	
		2,892

East tower.

	Square feet.	
First floor:		
Entrance	340	
Storage of supplies	256	
Technology, office	275	
Herbarium	256	
Restaurant	1,186	
Second floor:		
Herbarium	1,062	
Third floor:		
Herbarium	378	
		3,753

South tower.

First floor:		
Head curator of biology, offices	573	
Comparative anatomy, laboratory	275	
Invertebrate paleontology, laboratory	523	
Second floor:		
Paleobotany, laboratories	845	
Invertebrate paleontology, laboratories	253	
Third floor:		
Paleobotany, laboratories	260	
		2,729

West tower.

First floor:		
Head curator of anthropology, offices	724	
Ethnology, laboratories	529	
Stairway	133	
Second floor:		
Ethnology, laboratories	247	
Historic archæology and religions, laboratory	249	
Ethnology, storage	460	
Third floor:		
Ethnology, storage	132	
Ethnology, laboratory	132	
		2,606

Northeast pavilion.

First floor:		
Mammals, laboratories and storage	1,032	
Birds' eggs, laboratory and storage	600	
Superintendence	30	
Stairway	230	
Second floor:		
Ethnology, laboratory	189	
Materia medica, laboratory	209	
Reptiles and batrachians, laboratories and storage	1,206	
Stairway	213	
Third floor:		
Mammals, storage	1,341	
Basement:		
Mammals, storage, alcoholic and dry	1,227	
		6,277

Southeast pavilion.

	Square feet.	
First floor:		
Men's toilet room	524	
Women's toilet room	614	
Insects, laboratory and storage (Lepidoptera)	900	
Stairway	100	
Second floor:		
Insects, laboratories and storage	1,183	
Photographic laboratory	558	
Stairway	110	
Third floor:		
Photographic laboratory	1,440	
Fourth floor:		
Photograph print room	79	
		5,508

Southwest pavilion.

First floor:		
Engineer's office	186	
Fossil invertebrates, laboratories and storage	784	
Geology, laboratories and storage	864	
Stairway	193	
Second floor:		
Head curator of geology, offices	397	
Geology, laboratories and storeroom	1,210	
Stairway	232	
Third floor:		
Mineralogy, laboratory	1,390	
Basement:		
Pump room	169	
Boiler room	848	
Blacksmith shop	1,026	
Fuel vaults	2,436	
Stairway	213	
		9,948

Northwest pavilion.

First floor:		
Vestibule and anteroom	414	
Administrative assistant, offices	872	
Library	929	
Second floor:		
Assistant secretary, offices	1,040	
Library	502	
Stairway	148	
Third floor:		
Office of correspondence and documents	1,320	
Basement:		
Storage, electrotypes of publications	766	
Storage, documents	169	
Storage, miscellaneous supplies	420	
		6,580
Total floor space in towers and pavilions		40,293
Total floor and gallery space		103,195
Total floor space in building		143,488

Smithsonian Building.

PARTS OCCUPIED BY THE NATIONAL MUSEUM

Basement.

		Square feet.
[a] 1.	(International exchanges.)	
2.	(International exchanges.)	
3.	Fuel storage	1,024
4.	Boiler room	675
5.	Machine shop	382
6.	Electrical storage and connections	606
7.	Toilet room	63
8.	(Smithsonian Institution.)	
9.	Mechanical storage	358
10.	Men's toilet room	384
11.	Women's toilet room	353
12.	Supplies, storage	423
	Corridor between 12 and 14. Fishes, alcoholic storage	270
13.	Mollusks, dry and alcoholic storage	460
	Corridor between 13 and 15. Marine invertebrates, alcoholic storage	270
14.	Mollusks, alcoholic storage	695
15.	16, and 17. Marine invertebrates, alcoholic storage	1,498
	Corridors between 16, 17, and 18. Fishes, alcoholic storage	626
18.	Fishes, alcoholic storage	1,195
19.	Birds, dry and alcoholic storage	1,367
20.	Fishes, alcoholic storage	1,132

First floor.

21.	Main entrance hall	279
22.	Office of Superintendence	233
23.	Headquarters of the Watch	230
24.	Game animals and archæology, exhibition hall (stairway hall)	742
25.	Birds, exhibition hall (200 feet 4 inches by 49 feet 11 inches). (The exhibition cases of mollusks occupy 739 square feet through the center of this hall)	9,992
26.	Children's room, exhibition hall (25 feet 4 inches by 22 feet 8 inches)	574
27.	Insects, exhibition hall (60 feet by 37 feet)	2,220
28.	Fishes, laboratory	378
29.	Marine invertebrates, laboratory	227
30.	Marine invertebrates, exhibition hall (66 feet 7 inches by 34 feet 9 inches)	2,497

Second floor.

31 and 32.	Mollusks, laboratory, and storage, two main galleries and one end gallery	2,541
33.	Birds, laboratory, and storage, one main gallery and one end gallery	1,325
34.	Marine invertebrates, laboratory, and storage, one main gallery	1,216
35.	(Smithsonian Institution, storage of instruments.)	
36.	Office, exposition archives	97
37.	Birds, laboratory	233
38.	Marine invertebrates, laboratory	325

[a] The numbers refer to the floor plans of the building (Plates 28 and 29), exclusive of the eastern end, which is mostly used by the Smithsonian Institution for administrative purposes, the library, exchange service, etc.

	Square feet.
39. Biological laboratory	233
40. Fishes, storage	617

Third floor.

41. Prehistoric archæology, exhibition hall (200 feet by 49 feet 7 inches)	9,916
42. (Smithsonian Institution, former Regents' room.)	
43. Prehistoric archæology, storage	198
44, 45, and 46. Prehistoric archæology, laboratory	775

North tower, upper floors.

47–53, and 56. Mollusks, laboratories, and storage	1,372
54 and 55. Marine invertebrates, storage	266
57–62. These rooms constitute the five upper stories of the north tower and are not occupied	979

South tower, upper floors.

The floors above the old Regents' room are used by the Institution mainly for the storage of publications.

East end.[a]

63. Registrar's office and files	424
64. Shipping office	287
65. Disbursing office	471
66. Registrar's storage (basement)	865
67. Documents, storage, and shipping rooms	708
Total floor space in Smithsonian	51,998

OUTSIDE BUILDINGS.

Frame building on reservation south of Smithsonian building.

	Square feet.	
Mammal taxidermists' workroom	1,060	
Tin shop	340	
Total		1,400

Natural History Laboratory on reservation west of Smithsonian building.

Bird taxidermists' workroom, second floor	615

Frame shed on Armory square adjacent to Bureau of Fisheries (entirely used for storage).

	Square feet.		
Anthropology:			
Ethnology	490		
Fisheries exhibit	4,215		
Technology	745		
American history	112		
		5,562	
Biology:			
Mammals		1,318	
Geology:			
Minerals		193	
Total			7,073
Three buildings on Smithsonian and Armory reservations			9,088

[a] These numbers are not given on the plans.

Buildings at 431 Ninth street SW. (rented). (One brick building, several frame sheds, and a large uncovered area entirely used for storage.)

		Square feet.	
Anthropology:			
Ethnology	5,507		
Technology	811		
Water transportation	122		
American history	60		
		6,500	
Biology:			
Mammals	2,010		
Birds	500		
Comparative anatomy	1,110		
Samples of woods	122		
		3,742	
Geology:			
Economic geology	542		
Minerals	535		
Fossil vertebrates	1,024		
Fossil invertebrates	813		
Fossil plants	542		
		3,456	
Superintendence:			
Cases, tools, etc		6,986	
Miscellaneous supplies		445	
Total			21,129

Building at Tenth street and Maryland avenue SW. (rented).

Anthropology:			
Ethnology, workroom	937		
Ethnology, storage	165		
		1,102	
Biology:			
Comparative anatomy, workroom	706		
Comparative anatomy, storage	216		
		922	
Geology:			
Economic geology, workroom	305		
Economic geology, storage	165		
Fossil vertebrates, workroom	1,166		
Fossil vertebrates, storage	1,417		
		3,053	
Label office		729	
Heating and power plant		600	
Total			6,406

Building at 217 Seventh street SW. (rented).

Carpenter shop on all three floors	3,387	
Anthropological workroom (model making)	268	
Total		3,655

Building in rear of 915 Virginia avenue SW. (rented).

Paint and glass shop, two floors	2,925
Total rented buildings	34,115

TOTAL FLOOR AREA OCCUPIED BY THE UNITED STATES NATIONAL MUSEUM.

	Square feet.
Museum building	143,488
Smithsonian building	51,998
Three buildings on Smithsonian and Armory reservations	9,088
Rented buildings	34,115
Total	238,689

U. S. NATIONAL MUSEUM.

ALLOTMENTS OF SPACE, ARRANGED BY SUBJECTS, JANUARY 1, 1904.

DEPARTMENT OF ANTHROPOLOGY.

Exhibition halls.

	Square feet	
Ethnology:		
Eastern and Great Plains tribes	4,412	
Pueblo tribes	3,931	
Eskimo and Northwestern tribes	3,147	
Central and South America	1,076	
Eastern Hemisphere	4,851	
Indo-Pacific region	1,194	
Philippine Islands	537	
Basketry	538	
		19,686
Historic archeology		1,537
Prehistoric archeology		9,916
Technology		6,368
Water transportation		3,148
Graphic arts		3,929
Ceramics		2,150
Materia medica		1,057
Religions		1,495
American history		8,904
Miscellaneous (rotunda galleries)		600

Offices, laboratories, workrooms, and storage.

Office of Head Curator		724
Laboratories and classified storage:		
Ethnology	2,580	
Historic archeology and religions	249	
Prehistoric archeology	973	
Technology	275	
Materia medica	209	
American history	727	
		5,013
Preparators' workrooms		1,526
Gross storage:		
Ethnology	6,162	
Technology	5,771	
Water transportation	122	
American history	172	
		12,227
Total for anthropology		78,280

DEPARTMENT OF BIOLOGY.

Exhibition halls.

	Square feet.	
Mammals	9,540	
Birds	9,253	
Reptiles and fishes	3,149	
Insects	2,220	
Mollusks	739	
Other marine invertebrates	2,497	
Comparative anatomy	4,463	
Game animals	742	
Children's room	574	
		33,177

Offices, laboratories, workrooms, and storage.

Offices of Head Curator		573
Laboratories and classified storage:		
Mammals	5,518	
Birds	3,532	
Birds' eggs	600	
Reptiles and batrachians	1,206	
Fishes	4,451	
Insects	2,681	
Mollusks	5,068	
Other marine invertebrates	3,802	
Comparative anatomy	275	
Herbarium	4,374	
		31,507
Preparators' workrooms:		
Mammal taxidermists	1,060	
Bird taxidermists	615	
Comparative anatomy	706	
		2,381
Gross storage:		
Mammals	3,328	
Birds	500	
Comparative anatomy	1,326	
Plants	122	
		5,276
Total for biology		72,914

DEPARTMENT OF GEOLOGY.

Exhibition halls.

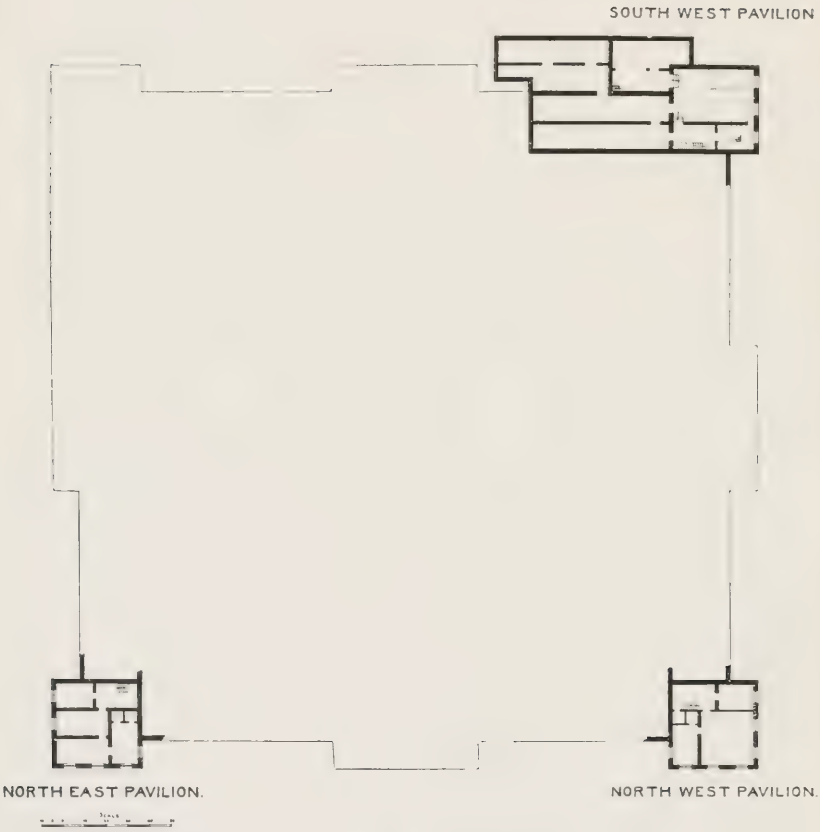
Systematic geology	4,463	
Applied geology	6,145	
Mineralogy	3,149	
Vertebrate fossils	3,979	
Invertebrate fossils	1,083	
Fossil plants	1,083	
		19,902

Offices, laboratories, workrooms, and storage.

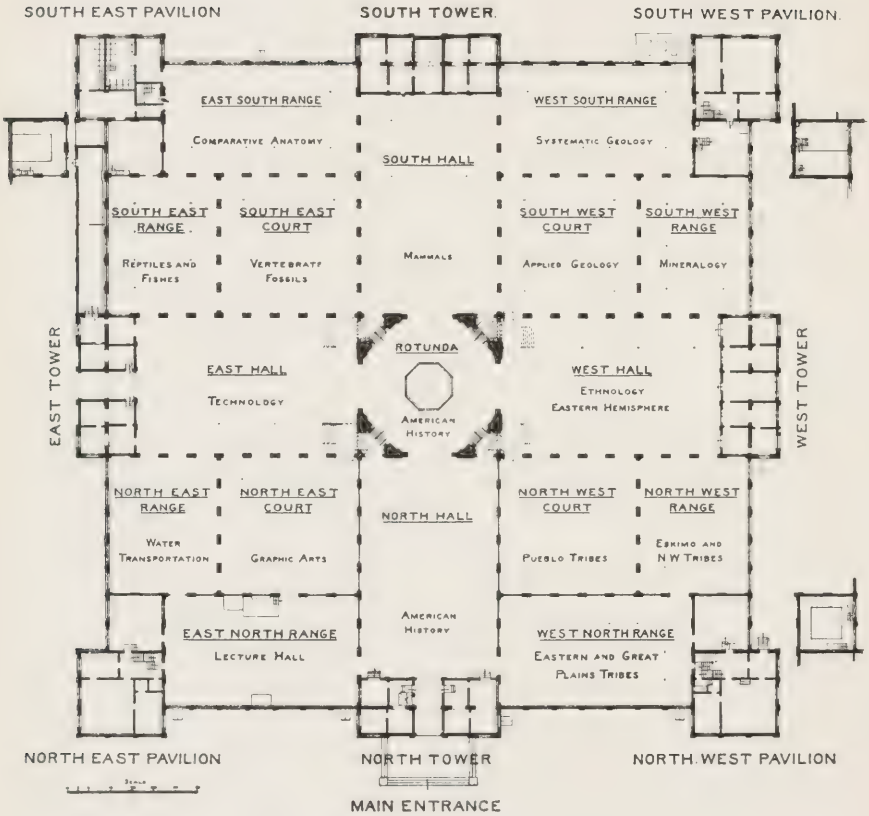
		Square feet.
Office of Head Curator		397
Laboratories and classified storage:		
General geology	2,672	
Minerals	1,845	
Fossil vertebrates	1,394	
Fossil invertebrates	1,560	
Fossil plants	2,499	
		9,970
Preparators' workrooms:		
General geology	305	
Fossil vertebrates	1,166	
		1,471
Gross storage:		
General geology	707	
Minerals	728	
Fossil vertebrates	2,441	
Fossil invertebrates	813	
Fossil plants	542	
		5,231
Total for geology		36,971

ADMINISTRATION, GENERAL WORKSHOPS AND STORAGE, AND MISCELLANEOUS.

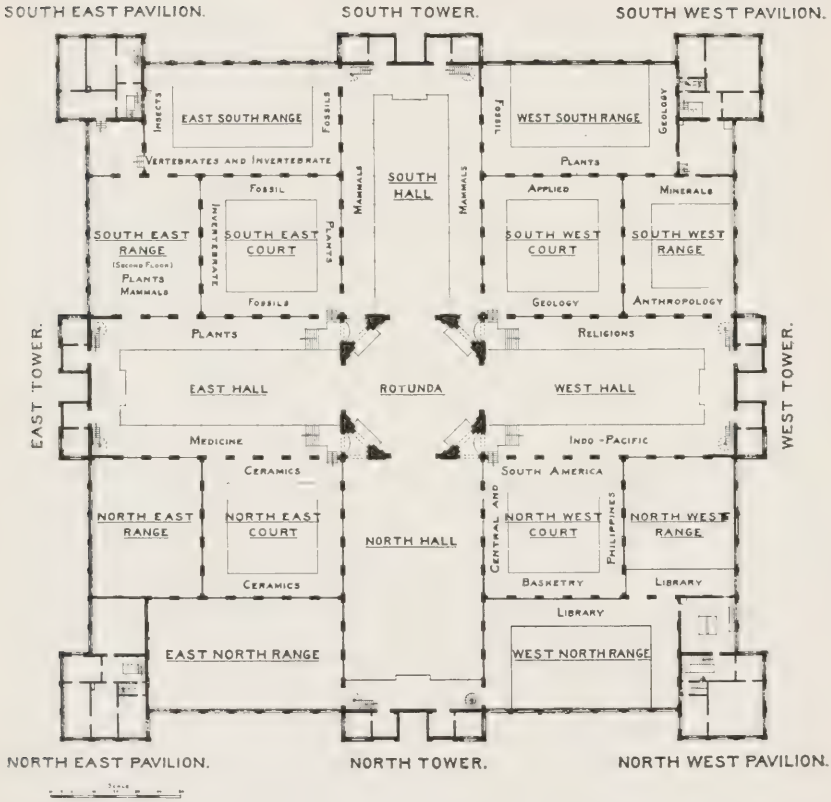
Offices:		
Assistant Secretary in charge	1,040	
Administrative assistant	872	
Correspondence and documents	1,320	
Superintendence	760	
Disbursing officer	471	
Registration	424	
Shipping	287	
Property	250	
Editorial	404	
Engineer	186	
Watch headquarters	363	
Telephone exchange	129	
		6,506
Library		3,677
Photographic laboratory		2,077
Lecture hall		4,429
Restaurant		1,186
Toilet rooms		1,938
Heating plants:		
Boiler room (Museum)	1,017	
Fuel storage (Museum)	2,436	
Boiler room (Smithsonian)	675	
Fuel storage (Smithsonian)	1,021	
Tenth street building	600	
		5,749



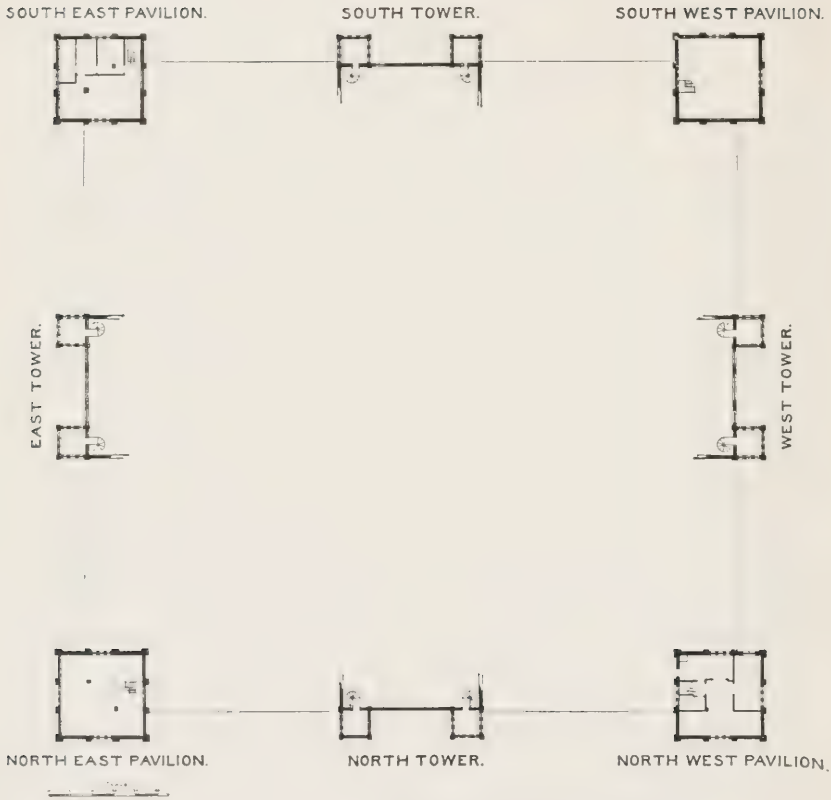
PLAN OF BASEMENTS, NATIONAL MUSEUM BUILDING



PLAN OF MAIN FLOOR, NATIONAL MUSEUM BUILDING.

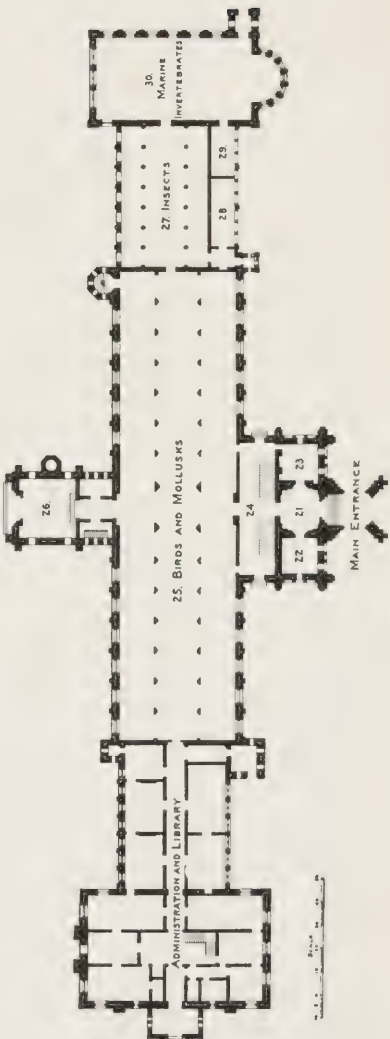


PLAN OF GALLERY AND SECOND FLOOR, NATIONAL MUSEUM BUILDING.



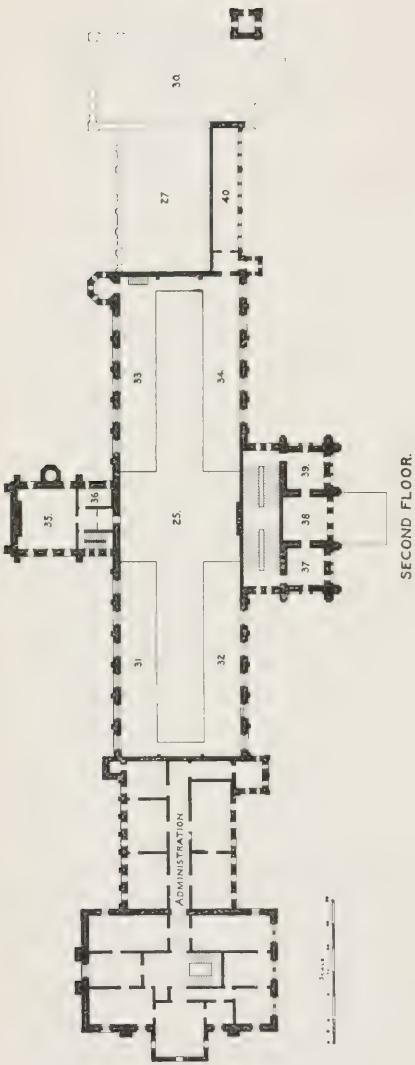
PLAN OF THIRD FLOOR, NATIONAL MUSEUM BUILDING.

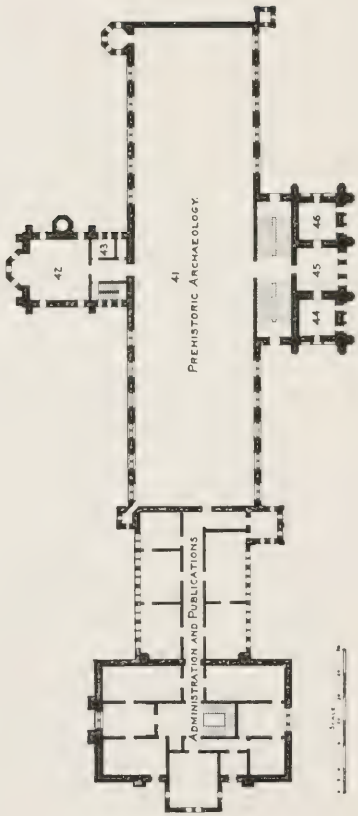
BASEMENT.



GROUND OR FIRST FLOOR.

PLAN OF BASEMENT AND FIRST FLOOR, SMITHSONIAN INSTITUTION BUILDING.





PLAN OF SECOND AND THIRD FLOORS, SMITHSONIAN INSTITUTION BUILDING.

	Square feet.	
Workshops:		
Carpenter	3,387	
Painting and glass	2,925	
Blacksmith	1,026	
Machine	382	
Tinsmith	340	
Label printing	729	
		8,789
Storage:		
Cases, tools, etc	7,016	
Miscellaneous supplies	1,544	
Mechanical supplies	358	
Electrical supplies, etc	606	
Publications	877	
Electrotypes of publications	766	
Registrar's	865	
		12,032
Entrances, halls, stairways, etc		4,141
Total for administration, etc		50,524

SUMMATION BY DEPARTMENTS.

Anthropology	78,280
Biology	72,914
Geology	36,971
Administration, general workshops and storage, and miscellaneous	50,524
Total	238,689

SUMMATION BY SUBJECTS.

Exhibition halls:		
Anthropology	58,790	
Biology	34,005	
Geology	19,902	
		112,697
Scientific offices, laboratories, workrooms, and classified storage:		
Anthropology	5,737	
Biology	31,252	
Geology	10,367	
		47,356
Preparators' workrooms:		
Anthropology	1,526	
Biology	2,381	
Geology	1,471	
		5,378
Gross storage of collections:		
Anthropology	12,227	
Biology	5,276	
Geology	5,231	
		22,734
Administrative offices		6,506
Library, photographic laboratory, lecture hall, restaurant, toilet rooms		13,307
Heating plants		5,749
Workshops (construction and repair)		8,789
Storage of outfit, supplies, publications, etc		12,032
Entrances, halls, stairways, etc		4,141
Total		238,689

STUDIES OF THE MUSEUMS AND KINDRED INSTITUTIONS OF NEW YORK CITY, ALBANY, BUFFALO, AND CHICAGO, WITH NOTES ON SOME EUROPEAN INSTITUTIONS.

By A. B. MEYER,

Director of the Royal Zoological, Anthropological, and Ethnographical Museum in Dresden.

Translation, revised by the author, from Abhandlungen und Berichte des Königlichen Zoologischen und Anthropologisch-Ethnographischen Museums in Dresden, Band IX, 1900–1901, and Band X, 1902–1903.

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STUDIES OF THE MUSEUMS AND KINDRED INSTITUTIONS OF NEW YORK CITY, ALBANY, BUFFALO, AND CHICAGO; NOTES ON SOME EUROPEAN INSTITUTIONS.

By A. B. Meyer,
Director of the Royal Zoological, Anthropological, and Ethnographical Museum of Dresden.

A.—Museums and Kindred Institutions of New York City, Albany, Buffalo, and Chicago.[a]

INTRODUCTION.

The authorities of the Royal Collections of Art and Science in Dresden commissioned me in 1899 to visit the museums and kindred institutions of the United States so far as they relate to museum affairs, and to pay special attention to the preservation of the collections from fire. In the time at my disposal I could master only a portion of what might properly have been studied. I was moreover obliged to confine myself to the eastern part of that great country; even then I had to turn aside from a number of cities and scientific centers well worthy of study, and I was far from able to exhaust the subject even in those places that I visited. This will explain many omissions in my report. I was in New York from the 8th to the 26th of August and from the 19th to the 31st of October, in Albany from the 26th to the 29th of August, in Buffalo on the 29th and 30th of August, in Chicago from the 5th to the 13th of September, in Washington from the 14th to the 27th of September, in Philadelphia from the 27th of September to the 5th of October, and in Boston and Cambridge from the 5th to the 19th of October.

The parts of my report here presented include studies in New York City, Albany, Buffalo, and Chicago, and it is intended that other parts shall be printed as soon as possible, giving results of my studies in Washington, Philadelphia, Boston, and Cambridge.

In the United States a sharp distinction can not always be made between museums and libraries, since many of the latter also include

[a] Translation of Über Museen des Ostens der Vereinigten Staaten von Amerika. Reisestudien von Dr. A. B. Meyer. Verlag von R. Friedländer & Sohn in Berlin. 1900 and 1901. Part I, New York State; Part II, Chicago.

collections of art and science; but apart from this the libraries have in general already attained a higher degree of development than the museums, and for that reason I was the less able to pass them by. All things considered, the American libraries perhaps excel those of Europe in architecture and in administration methods, whereas this is not yet so decidedly the case with the museums. As both the libraries and the museums of the United States are almost unknown to us, I have assumed this lack of acquaintance in my report. However great the ignorance of Americans regarding Germany may be, it is at all events exceeded by the ignorance of the Germans regarding the United States. Although year after year more than a thousand young Americans study in German schools and thousands of men and women of the educated classes of the Union annually visit the "Fatherland," as Germany is affectionately called, proportionately few educated Germans go to the United States merely for the purpose of becoming acquainted with that country, with the exception of those who go to America to recuperate in the sharp atmosphere which stirs there.

Although German colleagues who had visited American museums and Americans who came to Germany told me that "we had not much to learn there," still the authoritative opinions of men like Zittel, Ball, and Wallace indicated otherwise. In 1883 the well-known paleontologist of Munich expressed the opinion that the Americans had begun to make their natural history treasures accessible to the public and to specialists in a manner worthy in many respects of admiration and imitation. In 1885 the late director of the Science and Art Museums in Dublin was particularly impressed with the methodical planning, thoroughness, and order prevailing in the majority of the American museums. Many, though of recent date, already displayed an astounding development of strength, and the American people were looking forward with great and joyful hopes to a giant increase of their spheres of usefulness. Finally the distinguished English naturalist declared, in 1887, that the Museum of Comparative Zoology of Harvard University, in Cambridge, Massachusetts, widely known as the Agassiz Museum, far excelled all European museums as an educational institution for the public, for students, and for the special investigator. That, however, was half a generation ago, a period which in America counts for as much as half a century or more with us; in fact, during the last twenty years many imposing libraries and museums have been established in the United States. New York, above all, shows the evident tendency to become the "first city of the world." It will at all events become the greatest by its natural power of expansion and its location. The ardent desire of everyone's local patriotism is to accomplish the best, and I believe that this aim will in time be attained. We Europeans must, each in his place, exert all our strength to avoid being outstripped. The other great cities of the eastern part of the United

States which were all I was able to visit, likewise offered material beyond my expectation in the field of my studies.

I was considerably impressed with the capacity of Americans in this department, and am inclined to maintain that museum affairs in general are on a higher plane than in Europe. This is irrespective of material, and refers more to scientific than to art institutions. So far as the buildings and administrative affairs are concerned, Europeans have few good and many ordinary and even bad museums. The Americans, on the other hand (I speak only of the eastern part of the country visited by me), have many more good and fewer ordinary or bad museums. These inferior museums, however, improve rapidly, corresponding to the pace maintained in that country, whereas in Europe the rate of improvement is hopelessly slow.

The unparalleled rapid development of affairs in the United States as compared with the Old World repels a critical method of examination by the observer, not only because what has been accomplished is in a high degree worthy of respect and admiration, nay, is often even overwhelming, but also because such criticism would, in many cases, be forestalled by changed conditions, so that the critic in judging the rapidly changing conditions must keep in mind the future not less than the present, and must even regard the projected as already accomplished. I therefore confine myself in the main portion of my report more to making conspicuous the positive, the instructive, and what is new to us, and relegate any critical remarks to footnotes, in order not to mar the general impression of my statements. With regard to these criticisms, I must guard against referring to European or even Dresden museums as if things were better in these. On the contrary, things are generally not done as well on this side of the "pond," as the Americans call the Atlantic Ocean. I should, therefore, have preferred to suppress such remarks entirely, but where there is light there are generally shadows also, and, honor to truth, I promised American friends and colleagues not to do so. It was thought that something might be gained here and there by criticism. But, although this may not come to pass, I wished to show my gratitude, in some measure at least, since the reception accorded me by all those interested in similar subjects with whom I had the pleasure of becoming closely acquainted was so obliging and overcoming that I can hardly express my feelings in words. There are no men more ready to help or more amiable than the learned citizens of the Union, and I hope that they will regard my report only as a "tribute of admiration and gratitude."

EFFORTS OF THE AMERICAN NATURAL HISTORY MUSEUMS TO INCREASE THEIR USEFULNESS.[a]

[The following observations, written by Doctor Meyer since the above introduction to the present work was printed, are added as of interest herein.]

There are in the United States 8,000 public libraries containing 50,000,000 volumes. Sixty of these libraries contain over 100,000 volumes each, and four of them have 500,000 each.[b] The increase in the number of public museums does not keep pace with this amazing increase in the number of libraries, although it has often been recommended that a small popular museum be attached to each public library.[c] There are 350 public museums, of which 250 are natural history museums.[d] Germany has perhaps 500 or more, among them 150 natural history museums.[e] Of the latter, France has 300,[f] and Great Britain 250.[g] Of the 250 natural history museums in the United States, 175 belong to schools and universities, 30 to learned societies, 30 are State museums, and 15 are maintained by private individuals or are supported by municipal funds. The State of New York, with 7,000,000 inhabitants, has thirty-one natural history museums; Pennsylvania with 6,000,000, nineteen; Massachusetts with 3,000,000, seventeen; Illinois with 5,000,000, fifteen; Ohio with 4,000,000, fourteen; California with 1,500,000, ten;[d] etc. The natural history museums, therefore, by virtue of their number, already play an important part not only as scientific museums, but also as a means of popular education, when we consider the efforts being made to serve the entire community. This will be evident from the following brief account:

Exhibition collections.—As far back as 1860, L. Agassiz, perhaps

[a] Translated from A. B. Meyer: Das Bestreben der amerikanischen naturwissenschaftlichen Museen, breiten Schichten des Volks zu dienen. (Verbesserter Sonderabdruck aus: Die Museen als Volksbildungsstätten. Berlin, 1904, pp. 93–96.

[b] Report of the Commissioner of Education, 1899–1900, Washington, I, 1901, p. 923; E. I. Antrim, The latest Stage of Library Development, *Forum*, 1901, XXXI, p. 337.

[c] See B. W. S. Jevons, Methods of Social Reform, London, 1883, p. 77, and E. S. Morse, If public Libraries, why not public Museums? Report U. S. National Museum, 1893, pp. 769–780, Washington, 1895. Also W. J. Conklin, The Union of Library and Museum, *Public Libraries*, VIII, 1903, pp. 3–8; E. W. Gaillard, The Beginning of Museum Work in Libraries, ib., idem. pp. 9–11, and A. H. Hopkins, The Link between Library and Museum, ib., idem, pp. 13–15.

[d] A complete list is contained in A. G. Meyer, *Science*, new ser., XVII, p. 843, New York, 1903. F. J. H. Merrill, Natural History Museums of the United States and Canada; New York State Museum Bulletin No. 62, 1903. This list names 242.

[e] Forrer and Fischer, Adressbuch der Museen u. s. w. 1897; Jahrbuch der bildenden Kunst, 1903; Friedländers Zoologisches. Adressbuch, 2 volumes, 1895 and 1901; R. Mielke, Museen und Sammlungen, Anhang, 1903, and others.

[f] Annuaire des Musees scientifiques et archeologiques, Paris, 1900.

[g] The Report of the British Association, Manchester (1887), London, 1888, pp. 97–130. Herein are listed 211 museums, of which 190 are natural history institutions.

the first to carefully consider such a plan,[a] had developed the principles on which he meant to separate an exhibition collection for visitors from a scientific collection for investigators in the museum of comparative zoology, which he was to establish at Cambridge in the United States. He actually carried out these plans a few years later. It was a long time before his ideas were adopted in Europe; but all new museums in the United States, at least, were similarly arranged from that time. In 1881 the U. S. National Museum at Washington adopted as of prime importance the general principle "to place no object on exhibition which had not some special educational value and which was not capable of attracting and instructing a large proportion of the visitors."[b] The U. S. National Museum, therefore, definitely adopted the principles which subsequently determined to a greater or lesser degree the mode of operation of all natural history museums in the United States. Consequently, the visitor to a museum is not tormented with endless series of like or similar objects, and he need not himself laboriously pick out from an excess of material the objects which are to him comprehensible, instructive, or entertaining. They are placed before him without any annoying and tiresome labor on his part. The carrying out of this principle, essential to an exhibition collection, is in general made easy for the American museums by the circumstance that means are willingly furnished them for the purpose. Every month at the New York Natural History Museum they place on exhibition those migratory birds which occur in the vicinity at that particular time. This fact is mentioned as a characteristic example of the way in which museum authorities strive to incite the public to a direct observation of nature. A. R. Wallace, the well-known English naturalist, as far back as 1869, described how a public museum for the people should be constituted;[c] but such an attempt, or even one approximating it, has not yet been made anywhere, though much has been said and written on the subject.

Departments for children.—In the large museums, a section may generally be found specially adapted to the comprehension of children. All, or nearly all, large libraries also have sections for children; thus, for example, the Brooklyn Museum of Arts and Sciences,[d] whose children's department was visited in the year 1902 by more than 84,000 children. This children's museum publishes a small illustrated

[a] Bibliothèque universelle et Revue suisse, 47 année, nouv. pér. XIV, 1862, pp. 527–40.

[b] Proceedings of the U. S. National Museum, IV (1881), Washington, 1882. Appendix No. 16.

[c] A. R. Wallace, Museums for the People, *Macmillan's Magazine*, London, 1869, pp. 7.

[d] See my American Museum Notes, I, pp. 9 and 58 (with illustrations), in Abhandlungen und Berichte des Dresdner Museums. Also A Preliminary Account of the Children's Museum, Bedford Park, opened December 16, 1899, Brooklyn, N. Y., 11 pp., 2 figs., and H. P. Shepstone, A Children's Museum, *The Quiver*, London, 1901, pp. 1182–86, with figures.

monthly magazine, the Children's Museum Bulletin, in which may be found much elementary instruction. Instructive lectures, illustrated by objects from the collections, are also given there for young teachers of both sexes. The children's library contains about 3,000 titles. Similarly in the National Museum in Washington. This Museum is under the direction of the celebrated Smithsonian Institution, which was founded in 1846 "for the increase and diffusion of knowledge among men," not alone, like our academies, for the advancement of "science" in its more restricted sense. The Smithsonian Institution is the most renowned scientific institution in the United States. Its director, the noted physicist and astronomer, S. P. Langley, though not specially occupied with museum affairs, took personal charge of the establishment of this children's room in the great Museum and worked out the details with loving care. All labels are worded in such a way as to be readily understood by children. The object was to develop the minds of the children and inspire them with a love for nature, as had been proposed by Agassiz. This, it was thought, could best be accomplished by withholding from them the confused mass of objects to be found in a scientific collection, so that they might be attracted and interested, but not oppressed and repelled. Langley has admirably expressed himself upon this subject and with the humor characteristic of Americans.[a]

Prizes for school children.—Direct efforts are made to induce pupils of both sexes to visit the museums by offering prizes for essays adapted to the different classes. This custom has been carried on especially at the Carnegie Museum, Pittsburg, since 1896. The report on the subject for the year 1902 occupies 41 pages.[b] At the last competition 47 prizes of from five to twenty-five dollars were offered. The subjects proposed were (1) bird life, as illustrated in the museum; (2) minerals and gemstones in the museum; (3) why I like the Carnegie Museum. No composition was to exceed 1,200 words in length. The contest lasted four weeks. Even the teachers whose pupils show the best training are suitably rewarded. Last year 813 children took part in the contest. The award of prizes is always made the occasion for a great popular gathering and resembles a kind of public jubilee. The best two essays on bird life are printed in the above-named report. They were submitted by boys 13 and 17 years of age. That of the younger boy is particularly well done.

Lectures.—Great influence is exerted by public lectures. Two striking examples of this may be given. The American Museum of

[a] The Children's Room in the Smithsonian Institution. By A. B. Paine, Smithsonian Report for 1901, pp. 553–560, pls i–xx, Washington, 1902. See also *St. Nicholas*, New York and London, September, 1901, pp. 963–73, with figures.

[b] See The Carnegie Museum, Pittsburg. Prize Essay Contest, 1901. Publications of the Carnegie Museum, Serial Nos. 13 and 19, Pittsburg, 1901 and 1902.

Natural History in New York is divided into 12 departments. The department of public instruction stands at the head of the list, a circumstance which indicates the main object of the museum. The director of this department constantly keeps in stock, so to speak, 400 lectures on 200 different subjects. One series is especially prepared for teachers, another for the general public, a third for members of the museum and their families. A person may become a member by the annual payment of $10. In the year 1902, 90 lectures were delivered before 27,000 persons.[a] The Institute of Arts and Sciences in Brooklyn holds annually more than 4,000 meetings with lectures, exhibitions, and instruction for more than 250,000 persons.[b] A considerable part of these lectures and exhibitions devolves upon the museum of the institute which is established upon a very large scale. It would be a mistake to suppose that upon this account the scientific affairs of the above-named museums are neglected. These are more in the hands of other officials.

Popular publications.—Many museums publish guides and pamphlets on various subjects. In this respect again, the American Museum of Natural History in New York takes the lead. We may recall, for example, guides to the collection of birds, guides to the geological and paleontological collection; also, a quarterly museum journal, in which all news relating to the museum is published in popular form; and, finally, pamphlets such as The Butterflies of New York and Vicinity, The North American Ruminants, The Collection of Minerals, and many others. All are profusely illustrated and thousands of copies are sold at moderate prices.

Lending of collections.—In different museums, collections are lent to public schools for educational purposes. For example, in the New York Natural History Museum a large number of such collections of 50, 100, or more specimens each are laid aside and lent for varying periods to the schools which apply for them. This is also done by the New York State Museum at Albany and others. In the first-named museum, school children with their teachers are allowed to study more carefully certain reserve collections and even to handle the specimens. Exceptional ability is, of course, required for the administration of such establishments, but the American citizen now demands that the museums make themselves useful in as many ways as possible, and continually provide some incentive to observation and study.

Time of opening.—The American museums are almost universally open daily from morning till evening, free of charge. On the other hand, the number of custodians is small as compared with European museums. The citizen of the United States rarely steals public prop-

[a] Annual Report, American Museum of Natural History, New York, 1902, p. 28.
[b] See my American Museum Reports, I, p. 9, loc. cit.

erty, since he regards it as belonging to him personally, whereas here in Germany, the authorities as proprietors antagonize the visitor, who is treated more or less as an intruder, and deports himself in an unassuming manner.

From the foregoing it will be seen that the Americans assign a leading part in the activity of their museums to the exhibition collections, which they arrange for wide circles of the educated, half-educated, and uneducated classes. At the same time, they foster the interests even of little children, and try to stimulate the older ones by offering prizes; they make the museums contribute directly to the cause of education by series of lectures, by popular publications, and by lending collections; and they keep the doors of their museums open to everybody from morning till evening. How far all this could be adapted to German conditions is a question which ought to be discussed in a separate article.

I.—THE CITY OF NEW YORK.

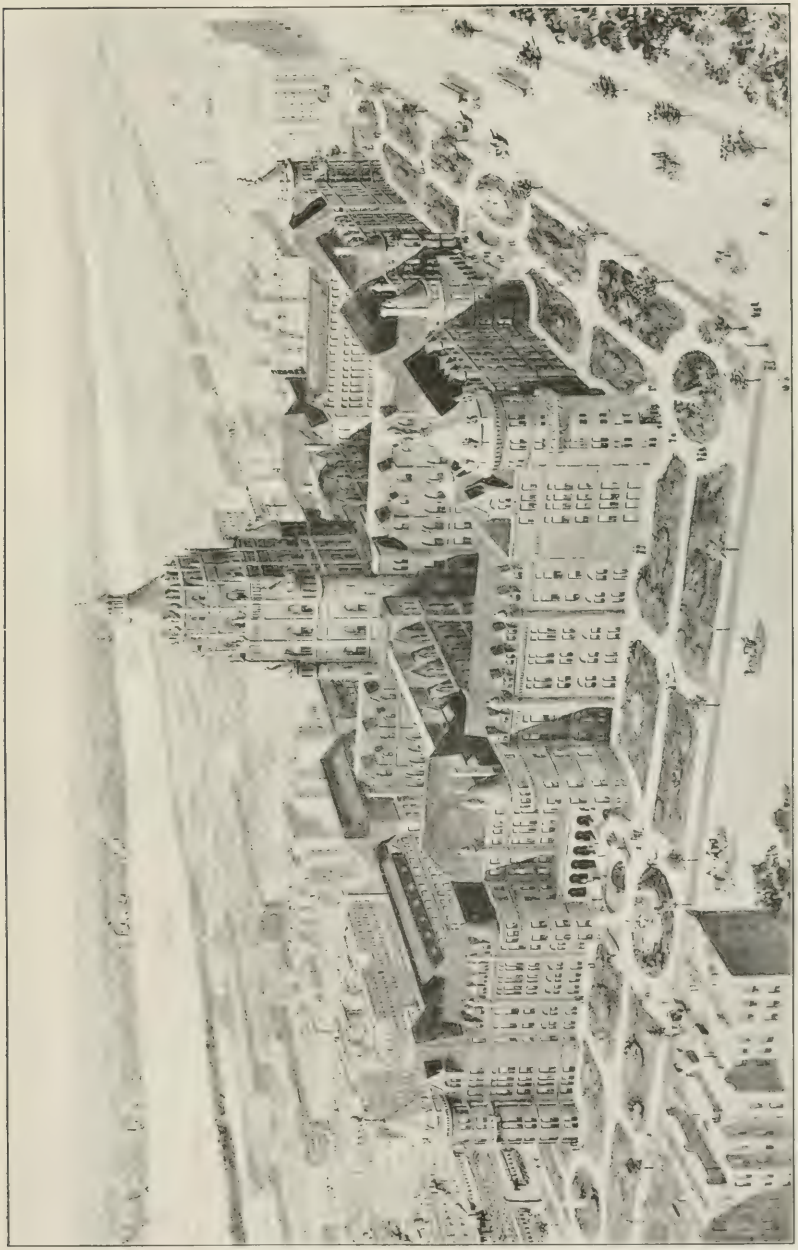
[Population 3,440,000, or, including its surroundings, 4,000,000 inhabitants.]

1. AMERICAN MUSEUM OF NATURAL HISTORY.

In comparison with other cities of the Union, New York was very slow in organizing a natural history museum, but when, in the year 1869, it was decided to establish one, a project on the grandest scale of all was adopted and collecting was immediately begun in a comprehensive way.

The building occupies a detached position alongside of Central Park near great business streets, and has a richly molded façade of red brick, syenite, and granite, with towers, jutties, balconies, roofs, etc., in modern Romanesque style, approaching the French castle type, which was introduced into England some decades ago. This style has flourished in the United States chiefly through the influence of the architect Richardson. The museum serves for anthropology, ethnography, archeology, zoology, paleontology, geology, mineralogy, and botany. The architects were, and still are, Vaux, Cady, Berg, and See. The inner building, 183 feet long, 65 feet wide, and 101 feet high, the first to be completed, was occupied in 1877. The existing collections were in the meantime accommodated in the old arsenal in Central Park. The height of the first floor is 18 feet; the second and third floors are together 30 feet, consisting in reality of only one floor and a gallery, the latter with a separate row of windows; the fourth floor 22 feet; and the fifth, 16 feet. The dimensions of the halls are 85 by 85, 155 by 75, 172 by 90, and 183 by 65 feet. In America they still reckon by feet, equal to 0.305 meter.

About one-sixth of the projected building is now erected. The entire building when completed, which may not be for generations,



AMERICAN MUSEUM OF NATURAL HISTORY.

General view of the completed building as planned.

will occupy 13 acres,[a] and will form a quadrangle with four courts, each 213 feet square. A dome-like central tower 300 feet high is also planned.[b] The south side of this quadrangle, 750 feet long and 75 to 90 feet wide, was completed in 1899, in addition to the previously built south arm of the central cross and the ground floor of the central building, as mentioned, and forms a palace six to seven stories high, including cellar and ground floor—from cellar to roof 127 feet high which has already cost, together with furniture, $2,800,000,[c] and affords 148,000 square feet of exhibition space. The building and furniture are paid for by the city by authority of the government of the State of New York. The city also owns the ground. In the year 1900, $150,000 was available for continuing the construction of the building. When the future completion of this enormous building is considered it may well be asked whether so great a show museum for natural history can still attain its objects.

The value of the existing collections is estimated at $2,800,000, and the library contains about 44,000 volumes.[d] The annual expenses of $136,000 are borne by the city, under authority of the government of the State of New York; $93,000 of these expenses are made up of salaries and wages. In the year 1899, $48,000 additional was raised by private contribution. Of the 71 employees 14 are scientists. A president who serves without salary is at the head of the institution, under a board of trustees of 24 members, mostly patrons of the establishment. Together with the president, who is a layman, a zoologist or paleontologist looks after the general scientific interests of the museum,[e] which are discussed with the higher officials as in a university faculty. The institution is divided into six departments:[f] (1) Public instruction; (2) geology, mineralogy, conchology, and marine invertebrates; (3) vertebrates; (4) vertebrate paleontology; (5) anthropology (physical anthropology, archeology, and ethnography); (6) entomology.

Each department is under the direction of a curator. Three of these curators have only two assistants each; one department has one

[a] The area is 750 feet square, equal to about 13 acres, or as large as the ground area of the British Museum, which, however, now occupies only 8 acres with its buildings, and as great as the ground area of the Natural History Museum in London, of which only 4 acres are now occupied by the building itself, 675 feet long, or four times as large as the old market in Dresden.

[b] It is still a question whether this will be erected. The towers of the Natural History Museum in London are 192 feet high.

[c] The building of the Natural History Museum in London cost $2,000,000.

[d] In 1901, 55,308 volumes.

[e] Recently (1902) the post of a director was created.

[f] Now (1903) there are twelve departments, as follows: (1) Public instruction; (2) geology and invertebrate paleontology; (3) mammalogy and ornithology; (4) vertebrate paleontology; (5) archeology; (6) ethnology; (7) mineralogy and conchology; (8) invertebrate zoology; (9) entomology; (10) physiology; (11) books and publications; (12) maps and charts.

assistant—in fact, there is too little scientific help for so great a museum. It is under the formal control of the regents of the university of the State of New York in Albany (see under Albany). The working hours of the scientists are from 9 or 10 a. m. to 5 p. m.; those of the other employees, from 7 or 8 to 5. For the increase of the collections $95,000 is appropriated annually, including the cost of expeditions. This sum is derived from private contributions, $18,500 of which is interest on a fund thus established.

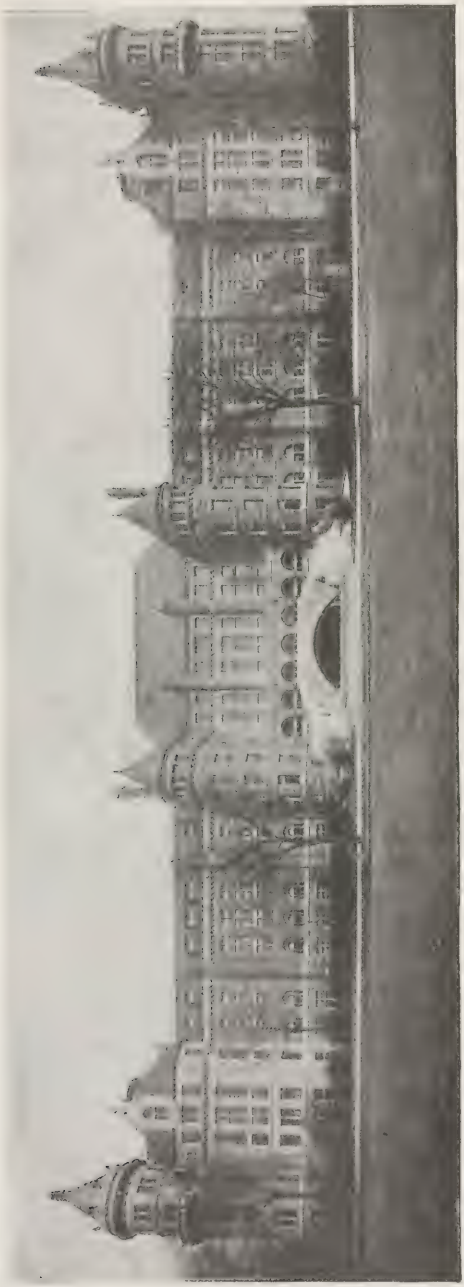


FIG. 1.—American Museum of Natural History. South front.

Besides this, about $10,000 are received from membership fees, and $1,400 from admission fees. In 1899 the trustees expended $75,000 to make good a deficit caused by purchases. The museum is open daily from 9 to 5[a] (Monday and Tuesday on payment of 25 cents entrance fee), Sunday from 1 to 5, and Tuesday and Saturday evenings from 8 to 10. Children under 8 or 9 years are admitted only when accompanied by grown persons. In 1899 the visitors numbered over 458,000 persons.[b] Umbrellas and canes are checked free—voluntary fees for this service are not customary. In 1898, 71 public evening lectures were given in a room on the ground floor, which is

[a] From such constant exposure to light, which, nevertheless, is usual in American museums, many portions of the collections rapidly go to ruin.

[b] This number has probably not increased after three years, for in 1902, 460,000 visitors were recorded; in 1900, 523,522; and in 1901, 461,026.

105 feet square, and accommodates 1,000 persons. A new lecture room, 130 by 130 feet, designed to accommodate 1,500 persons, has been completed. It is situated under the projected central tower. These lectures were given by assistants in the museum, professors of Columbia University in New York, and other scholars. There is a more extensive series, intended especially for teachers, for which the State of New York appropriates $12,000. The entire series of lectures in 1899 was attended by more than 66,000 persons, of whom 13,500 were teachers. There are also evening receptions and exhibitions of scientific societies.

The museum publishes annual reports (the thirty-first, for 1899, has 11 plates and 96 pages); octavo bulletins, with scientific papers and plates, of which 12 volumes have appeared; and quarto memoirs, of which 3 volumes are in print. There have also been published several illustrated guides for certain departments; and an illustrated monthly, *The American Museum Journal*, has been started. The museum sends out series of scientific expeditions, which are constantly bringing in a mass of fresh material, including valuable purchases. In the year 1899, 2 zoological, 3 paleontological, and 8 anthropological expeditions were in progress. These 8 expeditions, devoted to the anthropological, archeological, and ethnographical researches in the country, added to the museum 50,000 specimens.

The building is fireproof, of brick and iron, the floors being covered with tile and marble mosaic. The furniture is of wood. There are almost 20,000 lineal feet of cases and desks, for the increase of which an additional $75,000 was available in 1900. The plant for heating, ventilating, and lighting is now in the cellar, but is, however, to be removed to one of the courts on account of the marked shaking of the building. This will require an expenditure of $40,000. The heating is by steam. Ventilators, driven by steam power, force fresh air through the shafts into the building. Electricity and gas afford illumination. The rooms in the cellar and garret are spacious and light. Broad, slate-covered iron steps, in well-lighted staircases, lead from the bottom to the top of the building, but are little used, since large electric elevators, with a capacity of fifteen persons each, are constantly going up and down. The architectural and color ornamentation of the interior is simple throughout, often, one might say, scarcely present—a feature which distinguishes this from many European museums in a most advantageous manner. The painting of the interior is white or of a uniform light color.

Since the buildings as they now stand were erected separately during a period of over twenty-five years, something was necessarily gained by experience. The newer parts are more perfect than the older, and there can be no doubt that the remaining five-sixths of the museum to be constructed will be still better; since in such a complex mass of structures it is not necessary to maintain perfect uniformity in

the architectural details, slight departures are allowable from the general style to avoid defects brought to light by experience. Some of the newest rooms leave little to be desired with regard to dimensions, light, and fittings, as also with regard to the electric illumination directly from the ceiling. It may be strongly recommended that in other similar buildings attention be paid to what has here been accomplished.

Each floor is provided with very long lines of fire hose, which are connected with steam engines; moreover, portable fire extinguishers are to be found everywhere.

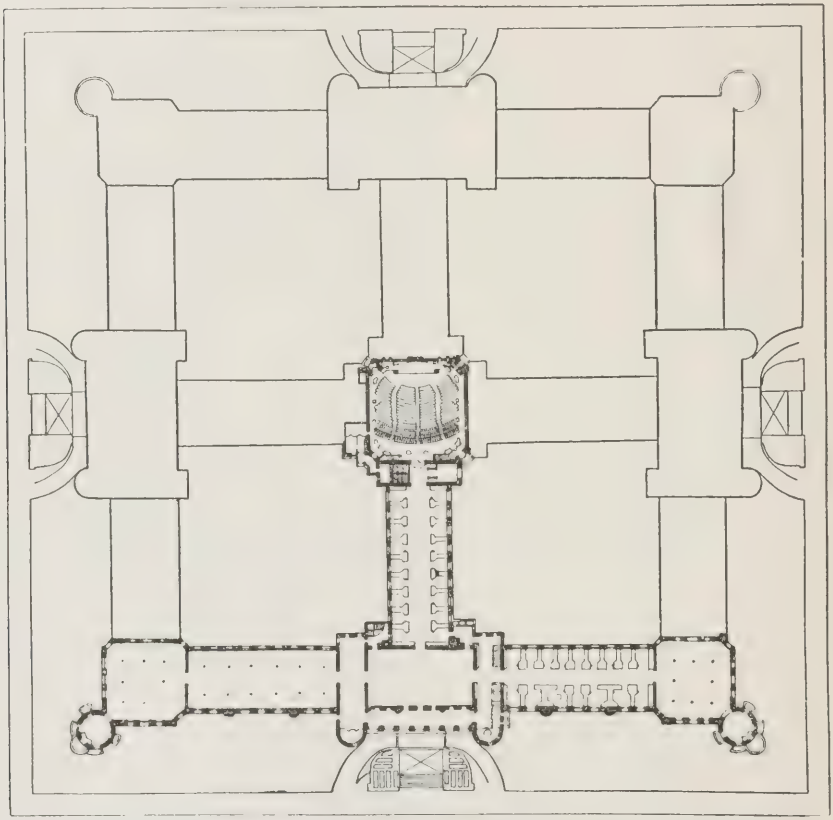


FIG. 2.—American Museum of Natural History. Ground plan. The heavier lines indicate the finished part of the building.

The collections are still unequally developed, a fact which may be explained by their recent acquisition. America, however, stands in the foreground in regard to collections. Paleontology shows a certain preponderance. North American mammals and reptiles are especially well represented. The series showing the development of the horse and the rhinoceros deserve especial attention, as also the giant reptiles—for example, a gigantic plant-eating dinosaurian 62 feet long.[a] Special

[a] *Camarasaurus supremus* Cope, see Memoirs, I, p. 5, 1899, and Bulletin No. 10, pp. 219–233, with 13 figures.

attention is paid to the art of stuffing and mounting animals.[a] Examples of this may be found in the great groups of the American elk and bison, surrounded by artificial foliage and the like, in cases 32 feet long, 18 feet wide, and 14 feet high; and also in different groups of birds, as for example, the pelicans. There are 55 such groups of birds and 20 of mammals displayed in as many separate cases, independent of the systematic collection.

In a section of the local bird collection the residents are separated from the migrants, and the latter are arranged in such a manner as to show those occurring in the neighborhood in different months, an arrangement that stimulates observation of nature. There are altogether about 12,000 stuffed birds in the collection. Particular attention should be called also to the room devoted to North American woods, especially to sections of the trunks, with the foliage, blossoms, and fruits in water color. Almost every forest tree north of Mexico is represented. The comprehensive collections of skeletons, displayed on the fifth story in a long corridor lighted from above, are practical and readily accessible. They lie in open, interchangeable, sliding drawers in cases with glass doors, so that the contents are readily accessible. The collections of 15,000 mammal skins and 70,000 bird skins are kept in separate and well-closed tin cases of three different sizes, standing one above another, with light, interchangeable sliding trays—an arrangement to be recommended in case of lack of space. Disinfection is accomplished by means of hot air (127° C.), and also by bisulphide of carbon and by formalin.[b]

Of the ethnographic and prehistoric collections, the American series

[a] The first preparator, J. Rowley, has published a book on the subject, The Art of Taxidermy (New York, D. Appleton & Co., 1898), in which may be found further information regarding some special methods.

[b] Some additional details regarding the collections may be given here. In the paleontological section are to be found the North American invertebrates of James Hall (see also under Albany), with their many types, which were purchased in 1875 for $70,000; the North American mammals, reptiles, amphibia, and fishes of E. D. Cope, as well as his pampas mammals; the Terrell collection of fossil fishes from Ohio; a fine series of moa skeletons, and the rich returns of the expeditions which the museum sends out every year. Besides what has been mentioned, we may also refer to the series of *Titanotherium* species and the *Tylosaurus dyspelor* (Cope), over 30 feet long. The entomological section contains one of the foremost general collections of insects in America, with about 400,000 specimens (Dresden has 280,000) and especially rich in types. The conchological section is conspicuous. The collection of mammal and bird skins is limited almost entirely to America. It contains the ornithological collections of Prince Max von Wied from Brazil, with many types; that of G. N. Lawrence from North America, and D. G. Elliot's collection of humming birds. The mineralogical section is very large and especially rich in jewels, which were collected by G. F. Kunz, the mineralogist of the well-known New York firm of Tiffany & Co., for the Paris Exposition of 1889. Another collection by the same mineralogist has just been purchased from the recent Paris Exposition for $50,000 and presented to the museum. [Mr. J. P. Morgan presented in 1901 the celebrated Bement collection of minerals, worth $200,000.] Finally, special mention may be made of a great collection of American building stones.

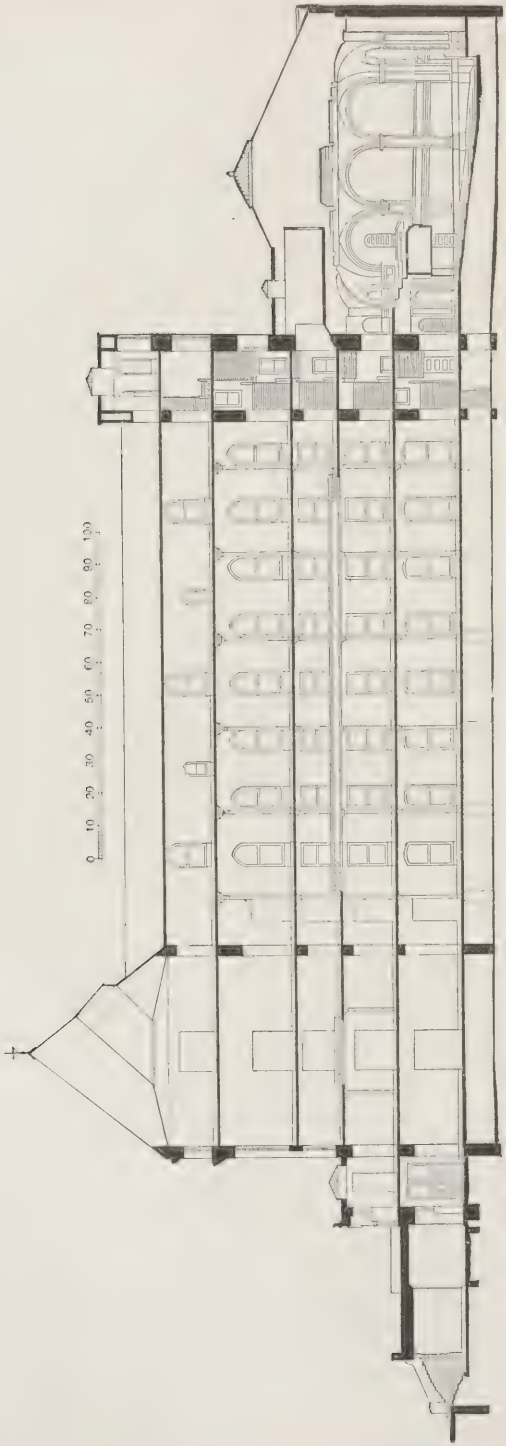


FIG. 3.—American Museum of Natural History. Section through the middle axis.

are noteworthy. The other regions of the earth, with the exception of the South Sea, are, on the other hand, as yet scarcely represented. The former already occupy five halls, each 85 by 183 feet long and 65

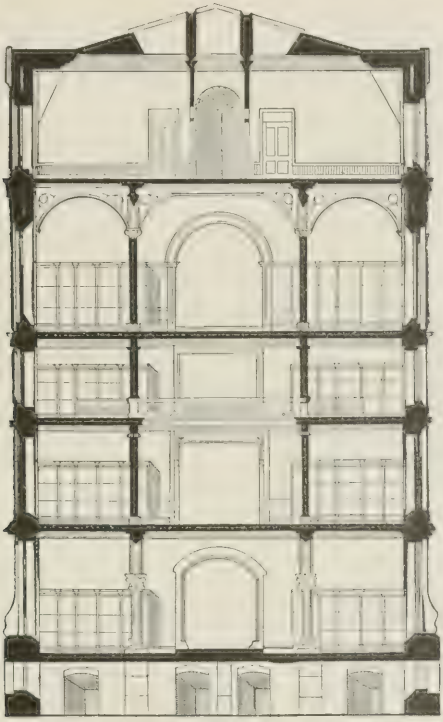


FIG. 4.—American Museum of Natural History. Cross section through the oldest wing.

by 85 feet wide, and four other similar halls will soon be ready. The nine halls have more than 118,000 square feet of floor surface (the ethnographic collection in Dresden, 2,600). The room devoted to North-

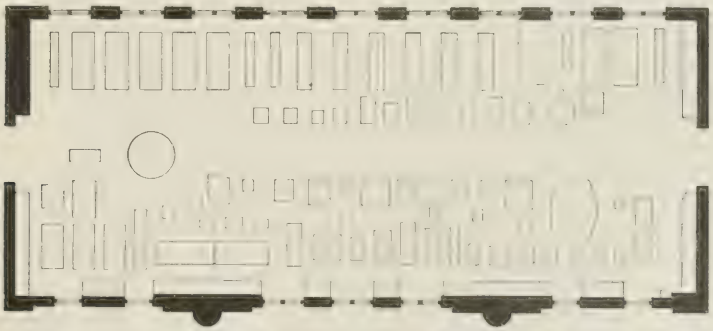


FIG. 5.—American Museum of Natural History. Floor plan of the Mexican hall.

western American culture (Pacific coast), in its comprehensiveness and its richness, makes a notable impression. The exhibition is instructive because it is arranged not only in geographical, but also in systematic

series, the latter particularly with regard to ornament and development of style in the artistic manifestations of the Indian tribes. The Mexican sculpture hall is equally rich and still more imposing. Here are casts, some of them colored, of monoliths, stelæ, idols, altars, pillars, walls, etc., of the ruins of Mexico and Central America, the originals of which still lie, with few exceptions, in the tropical thickets among the remains of ancient temples. There are also original stone sculptures from Copan and Yucatan, as well as ceramic and kindred collections relating to ancient Central American civilizations. Among these I may mention particularly the great series of nephrite, jadeite, and chloromelanite specimens.[a]

[a] The finest and most comprehensive collection of such nephrite and jadeite from all parts of the earth is in possession of H. R. Bishop, 881 Fifth avenue, New York, who has prepared a great work concerning them; it cost $40,000 to prepare the illustrations alone. In 1903, after the death of Mr. Bishop, this collection was incorporated in the Metropolitan Museum of Art in New York, which has thus acquired an inestimable treasure.

I add here a more detailed description of the ethnographic-archeological collection.

Two rooms on the first floor are devoted to ethnology, one on the second floor to North American archeology, particularly collections from the Pueblo region; the third floor (gallery) contains South American collections; the fourth, collections from Mexico and Central America. Four additional rooms in the southwest corner of the museum, which has just been completed, are to be devoted likewise to anthropology; on the first floor a continuation of the ethnological collections; on the second, of the collections of North American archeology; on the third, of the collections of South American archeology; on the fourth, continuation of the Mexican collections. The ethnographic halls contain especially quite complete collections from the North Pacific coast of America, from the Eskimos from northeast America, from the islands of the Pacific Ocean, among them a series of old specimens in particularly good condition from New Zealand, Hervey, Fiji, Samoa, etc. (such as may also be found in Cambridge, Boston, and Salem), and excellent collections from Mexico. Africa and Asia (excepting the Ainos) are as yet scarcely represented. [There have since been received large collections from China.] The annual report for 1899 says, on page 18, "Our collections from Europe, Asia, Africa, Australia, and many of the South Sea Islands are very poor."

The collections from the North Pacific coast depict the life in its different aspects. A group of four figures of natural size shows the domestic life of the Indians of this region, and at the same time the important part which the cedar plays in their economy. Alongside of it the employment of natural products is represented. Then comes a row of cases to represent the following categories: Art and industry products, household utensils, travel and transportation, hunting and fishing, war, clothing and ornaments, trade and exchange, music, decorative art, totemism, and religious ideas In this row of cases are brought together the general characteristics of the North Pacific culture. Then follow cases showing the particular characteristics of the Tlingit, Hauda, Tsimshian, Kwakiutl, Nutka, and the Salish tribes of British Columbia and the State of Washington.

The collection is important for an understanding of the artistic style of the Indians, particularly on account of the already well-explained objects from the North Pacific coast, for an understanding of the basket making of the States of Washington and California and of the style of ornaments of the Indians of the plains and western Mexico, etc.

Toward the close of 1899 the Mexican sculpture room was opened, of which I have

AMERICAN MUSEUM OF NATURAL HISTORY.

Hall of Mexican antiquities.

It may be assumed with certainty that this museum will develop during the twentieth century into one of the foremost natural history institutions of the world; and its president, Morris K. Jesup, under whose personal, self-sacrificing,[a] widely influential direction it has been since 1881, is thereby setting up for himself a lasting monument.[b]

given an illustration in Plate II and plan on p. 335. It was described in *Science*, XI, 1900, p. 20, by F. W. Putnam, the head of the department (and also director of the Peabody Museum of Archeology in Cambridge, Massachusetts). He considers this the most important collection in existence for the study of ancient Mexican and Central American civilization. I present herewith an abstract of his description.

Near the entrance the so-called "Great Turtle of Quiriqua" attracts attention. Beside it stands the "Dwarf," the smallest of the stelæ from the ruins of Quiriqua. A cast of the largest of these monoliths, 25 feet high, is in the hall below. On the right of the hall is a restoration of the sanctuary of the "Temple of the Cross," in Palenque, showing the position of the bas-relief known as the "Tablet of the Cross," with the officiating priests and an hieroglyphic inscription. Attached is an illustrated label explanatory of this temple. In the adjoining table case are several pieces showing hieroglyphics and figures made in stucco, which was widely used. The great "Calendar Stone," the most remarkable of Mexican sculptures, is on the south wall. On the opposite side of the hall are many fine bas-reliefs from ruins in Guatemala, Honduras, Palenque, and Yucatan. Over a case at the east end of the hall is a group of slabs from Palenque upon which are many columns of hieroglyphs. Near by are casts of slabs from the ruins of Chichen Itza in Yucatan, also sculptured stone posts of a doorway, upon which rests a carved wooden lintel. To the right of this is shown the sculptured wall of a portion of a room in a temple at Chichen Itza, on which are many human figures and a feathered serpent. There is evidence that this and many of the other sculptures were formerly painted in several colors, of which red, yellow, and blue predominated, as, for instance, the statue of Chac-Mools from Chichen Itza.

There are also on exhibition Tarascan terra cotta figures and stone sculptures, original sculptures in stone from Copan and Yucatan, pottery from the ruins of Casas Grandes, illustrating a culture approaching that of the ancient Pueblo people of Arizona and New Mexico; and also jadeite ornaments, copper implements and ornaments, carved stone yokes, a large terra cotta human figure, and pottery vessels of many forms, all illustrative of the culture of several of the ancient Mexican peoples. There are collections made by Doctor Seler in Mexico and Guatemala, and valuable terra cotta figures found in a mound at Xoxo, a cast of the inscribed stone lintel of the door of this tomb, and many vessels and skeletons. Finally, in a center case are various facsimiles of Mexican and Maya manuscripts in European collections. Compare also Ehrenreich's statements of the year 1898, regarding this department of the New York Museum in *Zeitschrift für Ethnologie*, 1900, pages 4–8, with three figures. (See also, opening of the anthropological collection in the American Museum of Natural History, *Science*, 1900, pp. 720–722.—1903.)

[a] In the year 1899 alone, Mr. Jesup gave $30,000 to the museum. In the course of almost twenty years, during which he has officiated as president, he has expended enormous sums on it. The Berlin Geographical Society recently made him an honorary member in recognition of his services for the advancement of the sciences. He is at the same time still actively engaged in the banking business.

[b] In conclusion, let me add a few more detailed remarks:

The orientation of the entire building would have been more favorable if its diagonal had been turned on its central point about 11 degrees, so that the façade, now completed, would face toward the southwest instead of toward the south-southwest.

2. MUSEUM OF THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES.

Brooklyn, with more than 1,250,000 inhabitants, has formed part of Greater New York since 1897. The Brooklyn Institute of Arts and Sciences dates from 1824, and received its present name in 1887. Its principal aim is the diffusion of knowledge by means of lectures, instruction, and museum collections. Its motto is from Washington's celebrated farewell address: "Promote as an object of primary

In that case the long side would be less exposed to the direct rays of the sun. It would then have been unnecessary constantly to protect the collections on exhibition by window curtains, which, under the direct rays of the sun, change the proper color of the objects and make conditions for exhibition unsuitable. This fact is usually lost sight of in connection with museum buildings, to the disadvantage of the collections installed in them. In the case under consideration the lines of the existing streets were followed. The unconformity which would have occurred by a slight turning of the building could, however, have been masked by planting groups of trees and the like. The building is massive and imposing, with a rich moulding, added solely with a view to architectural effect. The arrangement of individual rooms resulting from it is in many cases unsuited. As is very often the case with museums, this one was not built solely with reference to its needs; that is, constructed from within outward and the outer form of the building made to conform to the interior design. Thus, for example, the great projecting central part of the building darkens the halls lying behind it; the projecting towers produce inconsistency and irregularity in a number of the inner rooms; the crossbars of the windows and the window posts are too wide, and thereby unnecessarily reduce the light in the interior; in certain stories the windows themselves ought to have been higher and not extended down as far as the floor, for, had this been the case, the only advantageous method of lighting, by upper side light, etc., would have been secured.

The proportions of length, breadth, and height of some halls, and the width of the spaces between windows in relation to the width of the windows, are often extremely well worked out, so that individual portions of the museum, rather than the whole building, make the best impression.

The furniture, cases, and desks are of wood, with heavy framework, generally with many crossbars and relatively small panes, and they are not dust proof, except in the large show cases without doors. It is the more astonishing that they have not introduced iron cases, such as are to be found in many European museums, since America is far in advance of Europe in fitting out libraries and archives with iron furniture, and understands how to install it in a more perfect manner than we have yet attained. Objection may also be made to the dimensions and to the peculiar shape and the position of many of the cases with regard to the source of light. Too little regard has been paid to the architecture in its bearings upon the lighting arrangements; thus several of the fine large groups of animals (the bisons, among others) are considerably injured by reflections from the glass panes, which are distributed carelessly without consideration of the source of light. This, however, could easily be remedied. For the sizes of the cases and their distribution, it would have been more advantageous if the iron-supporting columns had stood farther toward the middle of the halls. These columns also run directly into the ceiling. The richly ornamented capitals in some halls do not harmonize with the prevailing simplicity of the interior decorations which in a great degree are worthy of imitation, except that in some of the older parts of the building they are too rough.

I have already mentioned that the number of scientific workers employed in this museum, which is advancing with giant strides, is entirely inadequate. The mass

BROOKLYN INSTITUTE OF ARTS AND SCIENCES.
General view of the projected Museum Building.

importance institutions for the increase and diffusion of knowledge." The society which composes the institute has about 6,000 members, who pay $5 entrance fee and annual dues, and is divided into 27 scientific and artistic sections, which meet in different buildings. At the head is a president with a board of 52 trustees and 11 different committees. The members also are organized into a council and 8 committees. The whole establishment is under the nominal control of the University of the State of New York (see under Albany). It

of material which is continually flowing in from the many expeditions, donations, and purchases, can not be properly attended to nor scientifically treated. The employees are therefore overburdened, an evil which I encountered in many of the American museums. Their outward splendors are out of proportion to the number and position of the scientists employed in them. The relatively small salaries usual in the United States, the instability of the positions (even under political influence), and the absence of the pension system contrast unfavorably with the conditions prevailing in Europe, where museums are better regulated and the positions more secure, and are more in consonance with the principles of fairness. Certainly museum employees do not command the same respect and enjoy the same rights in the Union as in the Old World. The employee is at a disadvantage against the influential powers who furnish to the museums the means of existence, is too much dependent upon them, and too much restrained in his rights. So much the more worthy of unstinted admiration are the idealism and the splendid achievements of many scientific men working under unfavorable conditions.

The lack of a central expert administration in the New York Museum [a director has since been nominated.—1903] is evident from the fact that all possible colors of backgrounds and labels are met with, as well as greatly varied methods of mounting, which are by no means all worthy of imitation.

The animal groups are excellently mounted. The accessories of leaves and flowers are carefully cast in wax and consequently transparent and very true to nature, but somewhat obtrusive. There is too much of this good work, for the attention is diverted from the object of the exhibition.

The manner of preserving the great skin collection in single tin boxes, with light trays of wood and pasteboard piled high one upon another, is inconvenient in the narrow rooms in which they are kept, although these boxes, whose lids can be taken off or tightly fastened with bolts, may in themselves be very practical. These trays are disinfected with bisulphide of carbon, which must often be renewed, and can be neither agreeable nor wholesome for the employees.

The butterflies of the exhibition collection are displayed in desks in a peculiar way, each specimen in a little pasteboard box by itself, covered with glass, on a thin gypsum plate adapted to its form—an arrangement which requires much space and produces, on the whole, a monotonous effect, however pretty each specimen may look. On page 32 of the Annual Report for 1899 there is an illustration of such a clumsy butterfly case. The makers of this method of preparation, Denton Brothers, of Wellesley, Mass., received at the Paris Exposition of 1900, a gold medal for their "collection and preservation of butterflies."

I do not, however, wish to be misunderstood. The American Museum of Natural History offers something quite extraordinary and stands relatively upon a very high plane, so that one not only may, but willingly does, overlook minor defects. Besides, what museum can be called faultless. I am convinced that this magnificently founded institution, in its further development, will in every respect be worth imitating.

[a] In 1902, 7,215 members.

maintains also a biological laboratory on the seashore, with 12 employees, as well as a larger museum for children in Bedford Park, the latter with 3 employees, one of whom is a naturalist.[a] The art building on Montague street, worth about $125,000, stands financially and otherwise in close relation to the institute. The library includes 27,000 volumes. From June 1, 1898, to May 31, 1899, 3,806 meetings were held, including lectures, demonstrations, and class reunions, which were attended by over 360,000 persons. The Institute has an invested fund of over $250,000, and an annual income of $175,000. The city gives $50,000, by authority of the government of the State

FIG. 6.—Brooklyn Institute of Arts and Sciences. A corner in the room devoted to Botany.

of New York, primarily for the running of the museum, and $75,000 are received from private donations.

[a] The museum for children is designed for young people from 6 to 20 years of age, and includes all human endeavors and interests, so far as they are comprehensive for youth or can serve for their education. The objects chosen all bear a definite relation to home life and school life. In 6 rooms on the basement floor are collections of models, animals, plants, anatomical preparations and meteorological instruments, as well as a lecture room which will accommodate 40. On the first floor are the library and administration rooms. The rooms are prettily decorated, and the cases are low enough to enable children to see everything well. Many things are here brought together which are of interest also to grown persons. I may mention a so-called type collection, such as is used in elementary schools in France. It con-

Not until 1890 did the Institute begin the founding of a museum. The cost of building and furnishing is borne by the city. Though not quite as large as the Natural History Museum in New York, it is planned on a great scale. The building ground is at the southwestern end of Brooklyn, on Prospect Hill, 175 feet in height, in an extensive partly-wild park of the same name, where 12 acres of land (750 by 725 feet) are reserved by the city for the museum. The collections comprise the arts and sciences. It is proposed to construct a square building in the renaissance style, with cupolas, facing almost exactly

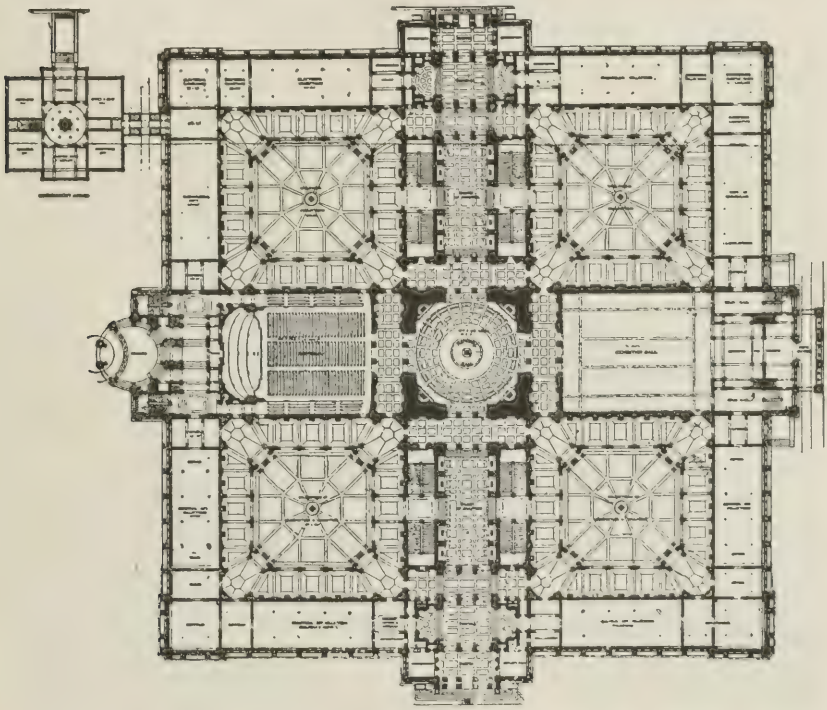


FIG. 7.—Brooklyn Institute of Arts and Sciences. Plan of first floor of the projected building.

north and south. Each side will be 560 feet long, thus occupying an area of 7 acres, or more than twice the size of the old market in Dres-

tains 35 minerals, 20 plants, 13 fossils, 3 worms, 3 echinoderms, 2 crabs, 90 insects, 10 mollusks, 2 fishes, 3 reptiles, 3 birds, and 2 mammals—altogether 186 specimens, and costs $20 in France. Further, as an example of how things are demonstrated to the children, to represent the leather industry there is shown a piece of animal hide, the different substances for tanning and dyeing, and also the bristles used in the manufacture of brushes. Or else, on a map of France, the wine districts are designated by small wine bottles, the coal districts by fragments of coal, the distribution of navigation by miniature metal ships, that of glass manufactures by little pieces of glass, etc. Nine hundred pictures and tableaus are hung up in succession. School teachers can also use the material of the collection in lectures to their pupils.

den. It will have four covered courts and three stories, exclusive of the basement, and in the central axis a fourth floor, the upper stories with skylights. Surrounding it is an open space 125 feet wide, reserved for greens and shrubs. (An exact plan of the whole building may be found in the eleventh Yearbook of the Institute, 1899, page 389.) The architects are McKim, Mead & White.

The foundation was laid in 1895, and in 1897 the first portion, the right wing of the north section, was completed (with exception of the statues of the chief frieze). This wing is 193 feet long, 43 by 64 feet wide, and 95 feet high (above ground). It is fireproof throughout, excepting a few wooden window frames on the ground floor (all others of iron), and a few oaken doors. The floors are supported by iron

FIG. 8.—Brooklyn Institute of Arts and Sciences. Finished portion of the Museum (1897).

beams and brick arches and are covered with terrazzo on a cement foundation. The façade is of white sandstone, harmoniously wrought. This portion cost, with furnishings, about $375,000, and represents about one-thirtieth of the entire building. The erection of the central building of the north side of the main portal has been begun,[a] for which $300,000 have been appropriated by the city. The collections are enlarged exclusively by donations. A learned director (at present a paleontologist) is at the head of the museum, which has 17 employees, 7 of whom are scientists,[b] and several honorary administrators of indi-

[a] Finished in 1903.

[b] A curator in natural history and anthropology and a curator in archæology and ethnology have since been appointed.

vidual sections with their subordinates. The working hours are from 9 to 6 on week days and the afternoon of Sunday; there is a weekly half holiday. The number of visitors in 1898–99 was about 93,000. Admission is free on Wednesday, Thursday, Friday, Saturday, and Sunday, even when these are holidays; on Wednesday and Saturday from 9 to 6; Thursday and Friday from 7.30 a. m. to 7.45 p. m., and Sunday from 2 to 6 p. m. On Monday and Tuesday from 9 to 6 there is an admission fee of 25 cents; children under 16 years, 10 cents, and children under 14 years are only admitted when accompanied by a grown person. Umbrellas and canes are checked free, voluntary gifts for this service not being customary. The Institute publishes an illustrated Yearbook (the eleventh for 1898–99 has 422 pages), as well as an annual prospectus, which contains reliable information regarding the lectures, demonstrations, and instruction. The prospectus for 1899–1900 contained 181 pages. The museum has as yet published only one catalogue of paintings (in two editions, 1898 and 1900), and an illustrated catalogue of the Goodyear collection of photographs of Italian architecture and sculpture (1896), which were taken on one of the museum expeditions (1895).[a] Other scientific expeditions are projected.

The distribution of space and the lighting of the portion of the building now standing are excellent.[b] As in the Natural History Museum in New York, the halls are almost without ornament. The walls and ceilings are white or of a uniform color, the lobbies and staircase light gray. This deserves special mention because the collections of so many museums, at least in Europe, are rather injured than benefited by too much decoration, or by the style of the decoration of the galleries. The engines for heating, ventilating, lighting, and electric power are located in the basement, and cause a shaking in certain portions of the building. The steam radiators are placed mostly under the windows or near them. A hot-air plant, besides, run by the steam engine, heats all the halls through openings about two-thirds above the floors. Ventilation is accomplished by means of an electric ventilator in the roof, but this does not seem free from objections. The problem is seldom well solved in large buildings. In the axis of a well-lighted, spacious, spiral staircase (iron steps overlaid with slate) an electric elevator runs to the roof, from which, on account of the high situation of the building, may be enjoyed a fine, extensive view, with the Botanical Gardens and Prospect Park in the foreground. The basement is 25 feet high and con-

[a] The publication of a *Science Bulletin* and of *Memoirs of Art and Archeology* have since begun.—1903.

[b] In this north tract the unfavorable position of the entire building with regard to the points of the compass is less apparent because the south side, which will adjoin a covered court, is in part protected from the rays of the sun.

tains exhibition rooms, administrative rooms, and machinery rooms. Each of the three floors contains four halls for collections—one 110 by 38 feet, one 42 by 42 feet, and two 16 by 40 feet. The first story is 29 feet high, the second, 22 feet; the third, with skylight, 24 feet.[a] All may be brightly lighted by electricity. Hand fire extinguishers are found on each floor, and on the ground floor a line of hose 150 feet long.

The basement contains a geographical collection, with many maps. The hall in which this is kept is plainly furnished and well lighted from both sides. The walls are light green, the ceiling white, and the floor of dark cement.

FIG. 9.—Brooklyn Institute of Arts and Sciences. Picture gallery.

The first story is devoted to sculpture. The great hall, where are found Greek and Roman statuary, is excellently lighted from the north side by means of upper side windows. The white casts are tastefully mounted on dark green pedestals against a light olive-green background. The ceiling is white, the window frames are a very light ocher, and the floor is gray mosaic, as are the other floors. The south side consists of a solid wall without windows, on the upper part of which the Parthenon frieze is displayed. Comfortable benches

[a] This is the picture gallery. The halls of the Dresden picture gallery, erected by G. Semper, are nearly 50 feet high; they are, in fact, much too high, and the skylights are too small, so that the halls are insufficiently lighted.—1903.

invite the visitor to prolong his stay. In this section is the magnificent collection of Italian photographs of Professor Goodyear.

The second floor is devoted to natural history and prehistoric objects with special reference to America. The large hall is lighted excellently from both sides except when the sun shines in from the south. The cases stand at right angles to the wall spaces between the windows, by which the best possible effect of lighting is attained. The walls are cream colored, the ceiling white, and the window frames ocher.[a]

The paintings are on the third floor (lighted from above), most of them provisionally loaned. The great gallery is not yet overfilled, and is furnished with comfortable benches. The walls are light Pompeian red, the ceiling white. Picture galleries are seldom seen in which the examination of the works of art are so little disturbed by the surroundings. The collection is, for an American collection, rich in landscapes of the seventeenth century and other works of the old masters, as also in pictures of the French school of 1830. I give in alphabetical order the names of the artists who are represented by more noteworthy paintings: Corot (4), Cortese (2), Courbet (3), Cuyp, Daubigny (3), Decamps (3), Diaz (5), Dupré (3), Etty (2), Fyt, Gainsborough (2), Géricault (2), V. Goyen (2), Hals, Hobbema, Lorrain, Marilhat, J. Maris (3), W. Maris (2), Mauve (7), Metsu, Michel (3), V. Mieris, Millet, Morland (3), Pannini (3), Rembrandt, De Reyn, Rosa (3), Rousseau (3), Ryckaert, Stork, J. Vernet (3), Vollon (2), Wilkie, Wilson (3).

The collections, noteworthy as they already are, may still be regarded merely as a beginning of much greater achievements. One might well wish to live to see the completion of the entire building, since it promises to be a highly creditable accomplishment, and the devotion of the citizens of this rich city guarantees that the museum will not lack good collections.

3. METROPOLITAN MUSEUM OF ART.

"For the purpose of establishing and maintaining a museum and library of art, of encouraging and developing the study of the fine arts, and the application of arts to manufactures and practical life, of advancing the general knowledge of kindred subjects, and, to that

[a] The cases are of wood, with clumsy framework, not meeting the present requirements (see remarks on the American Museum of Natural History, p. 338, footnote.) In a building where everything is fireproof—which even has iron window frames, something very hard to find anywhere else—it is strange that the kindred idea of introducing iron furniture did not occur to the builders.

The collection is still unequally developed. We may make special mention of the butterfly collection of nearly 100,000 specimens, with more than 1,200 types (the Dresden Museum has about 40,000 specimens, including about 8,000 species). No special care has as yet been bestowed upon the methods of exhibition.

end, of furnishing popular instruction and recreation," the Metropolitan Museum of Art has been planned, to occupy several detached buildings covering more than 18 acres of ground in Central Park, about half a mile from the Natural History Museum. Up to the present one building has been completed.[a] It is 345 feet long, 325 feet wide, and between 1876 and 1898 was erected in four sections by the elder Hunt on sloping, and, partly for that reason, deep-lying ground. It has four courts, a cellar, ground floor, and one additional story, and is constructed of red brick with gray granite trimmings, which looks very attractive, particularly in summer when the park is green. The older portion is in Italian gothic, the newer in renaissance style. The principal entrance is on one of the narrow sides. The cost amounts to $500,000, with $65,000 additional for interior furnishings and $90,000 for the power house. There is, besides, an imposing fireproof building of gray sandstone in the best renaissance style, 305 feet long, 103 feet wide, and 88 feet high, connected with the former on its rear side by a middle wing 107 feet long and 64 feet wide. This building was not finished, however, at the time of my visit.[b] The architect of the new building is the younger Hunt. It cost $1,000,000; the interior furnishings and the power house $220,000 additional. The city donated the ground and also, by authority of the government of the State of New York at Albany, bears the cost of building and makes an annual appropriation of $100,000 for the running expenses. These amount to about $130,000, of which $90,000 go for salaries and wages. The balance is paid by the corporation that founded the museum in 1870, from the interest on its funds, which amount to $580,000,[c] and from private donations and special sources of income, such as annual dues (about $20,000 from 2,000 members at $10), entrance fees (on two days of the week, $5,000), sales of catalogues ($3,000), etc.

Until 1879 the collections were stored, one after another, in two private houses. Patrons gave, and continue to give, the means for purchases, and donations and bequests were received in such profusion that the large halls of the present museum, comprising together almost 3¾ acres of space, were overcrowded after the first twenty years. They are now relieved by the removal of a portion of their contents to the new building, and the great hall of the latter is to be devoted specially to sculpture. The library has over 6,000 volumes. The value of the collections is estimated at more than $9,000,000. The building is open on week days from 10 to 6, Monday and Friday for nonmembers at an admission fee of 25 cents; also on these two days

[a] The second large building has since been completed (1903).

[b] Now (1903) finished.

[c] The museum in 1901 received $8,000,000 upon the death of Mr. Rogers, one of its trustees.

METROPOLITAN MUSEUM OF ART.

from 8 to 10 in the evening, and Sunday from 1 o'clock to dark. On shorter days the building is closed before sundown. Children under 7 years are admitted only when accompanied by grown persons. Copying is allowed only on Mondays and Fridays. The number of visitors in 1899 was 540,000, of whom about 200,000 came on Sundays. Entire schools of 300 pupils often come and spend the whole day in the museum. Umbrellas and canes are checked free. Voluntary contributions are not customary, but something is paid for depositing packages and the like.

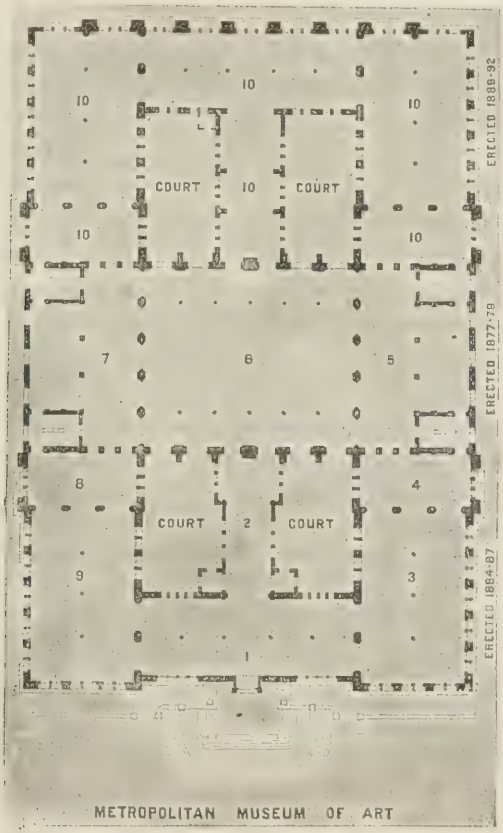


FIG. 10.—Metropolitan Museum of Art. Plan of first floor.

There has been published a series of catalogues, for the most part undated, on ancient Cyprian terra cottas and vases (3,654 numbers),[a] the ancient Cyprian stone sculptures (1,814 numbers), the Egyptian antiquities (2,206 numbers), the plaster casts and bronze reproductions (1,063 numbers), the hand drawings (882 numbers), the gems (331

[a]The best and fullest publication on the Cyprian vases of the collection is to be found in W. H. Goodyear's interesting work The Grammar of the Lotus, 1891, pp. 229–253 and 269–309.

numbers), the metal reproductions (396 numbers), the Asiatic seal cylinders (910 numbers), a part of the Chinese porcelains (1895), as well as a catalogue of old and new paintings, with 671 numbers, and one of spoons, with 300 numbers (1899). There are also published under the auspices of the museum engravings of some of the most important paintings, and (1885–1894) an atlas of the Cesnola collection of Cyprian antiquities, with 300 plates. A report is published every year; the thirtieth annual report, for 1899, with 68 pages.

There is at the head of the museum a director, who is under a board of trustees of 30 members, with a president of the corporation. There

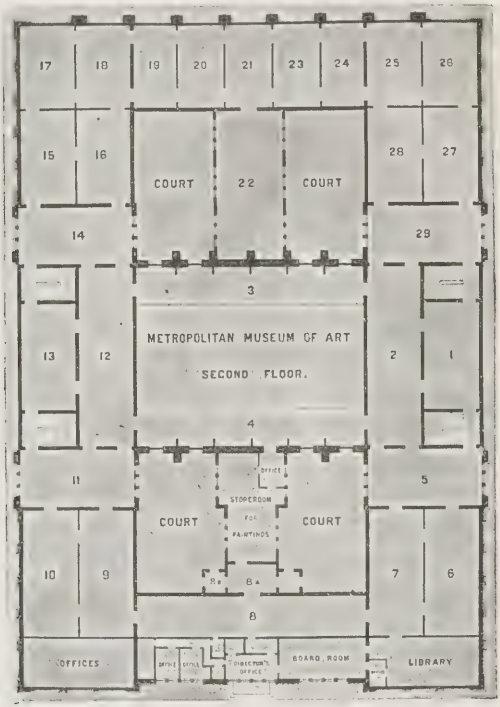


FIG. 11.—Metropolitan Museum of Art. Plan of second floor.

are also 9 different committees. The employees number about 100, of whom 3 are scientists. After the opening of the new building the number will be considerably increased. The working hours are from 7, 8, 9, or 10 in the morning till 6, or sundown when the sun sets before 6, and also while the museum is open in the evening. There is an hour intermission at noon. From 6 to 10 p. m., six watchmen are on duty, from 10 p. m. to 7 in the morning a night watch. More than 1,100 copyists, draftsmen, etc., made use of the collections in 1899. In winter free lectures on art are delivered every Saturday, beginning at 11 o'clock, which are attended mostly by women. Evening receptions for the members are also held.

METROPOLITAN MUSEUM OF ART.
Middle hall.

The center of the building is occupied by a large hall with skylight and galleries. In its four corners are somewhat narrow and steep wooden staircases, running to the second floor and to the cellar. In the latter are located a restaurant, and other conveniences. In the halls of the ground floor the windows are placed so high that cases can stand against the walls beneath them, an arrangement that looks well, but which does not appear everywhere to answer the purpose on account of the reflections and the deficiency of light. The floor is of white marble. Almost the whole second story is unsatisfactorily lighted by skylights, and in the picture galleries the light is further impaired by the plate glass, with which all the pictures are covered. The floor is made of parquetry, with an underlayer of cement one foot thick in the picture galleries as a protection against fire. In the summer the ventilation seemed insufficient. All the rooms can be lighted by electricity. The heating is by steam. The power house is located in a separate building.

In the middle hall is displayed a collection of casts and models of antique and mediæval architecture among them, on a large scale, the Pantheon, Parthenon, Temple of Karnak, Notre Dame (this model cost $20,000), Guild of the Butchers' House in Hildesheim, and many others, mostly with single parts of natural size beside them, and in every case photographs of the whole. In the other halls of the ground floor the collections from the Cyprian excavations are specially important. These demonstrate the Oriental influence on Græco-Roman art in vases, terra cottas, glasses, great stone sculptures, bronzes, etc. This most complete provincial collection shows in series the transitions from the prehistoric time, 1,200 years B. C. and earlier, to the Roman and Christian period of the fifth century, and is consequently very instructive. It cost $60,000. A precious collection of glasses from the most remote times to the present also deserve particular mention.

On the second floor the modern portion of the picture gallery is first to claim the attention. A collection of equal value is not to be found in Europe. Only the following names need be mentioned: The two Achenbachs, Bastien-Lepage, Benjamin-Constant, Rosa Bonheur (Horse Market—which cost $60,000 and was a gift to the Museum—and others), Bonnat, Bouguereau, Breton, Cabanel, Corot, Courbet, Couture, Defregger, Detaille (Defense of Champigny and others), Diaz, Gainsborough, Gallait, Gérôme, Hébert, Henner, Isabey, Israels, the two Kaulbachs, Knaus, Leighton, Makart, Manet, Max, Meissonier (Friedland 1807 which cost $69,000 and was a gift to the Museum and others), Menzel, Millet, Munkacsy, Piloty, Reynolds, Richter, Sargent, Scheffer, Stevens, Troyon, Turner, H. Vernet, Villegas, Voltz.[a] The entire collection could not be

[a] In 1900 Mr. Robert G. Dun bequeathed to the Museum a valuable collection of modern paintings worth $250,000.

classified by the schools of art represented because individual collections must remain intact in accordance with testamentary provisions. The systematic arrangement of such collections is rightly considered as of less importance than their acquisition. Frequently, also, large sums are bequeathed for their preservation. In the other halls of the second story may also be noted the great collection of musical instruments of all peoples and periods (concerning which a profusely illustrated work by M. E. and W. A. Brown appeared in 1888),[a] the ceramic collection, particularly from China and Japan, as also the Cyprian gold ornaments on exhibition in a room, which includes only precious articles of every kind.

A practical contrivance, which enables one to look through a series of volumes of photographs without exposing them to injury, should be mentioned. The books lie in glass desks, and when one wishes to turn over the separate leaves it is necessary to reach through an opening

FIG. 12.—Metropolitan Museum of Art. Sketch of completed building as planned.

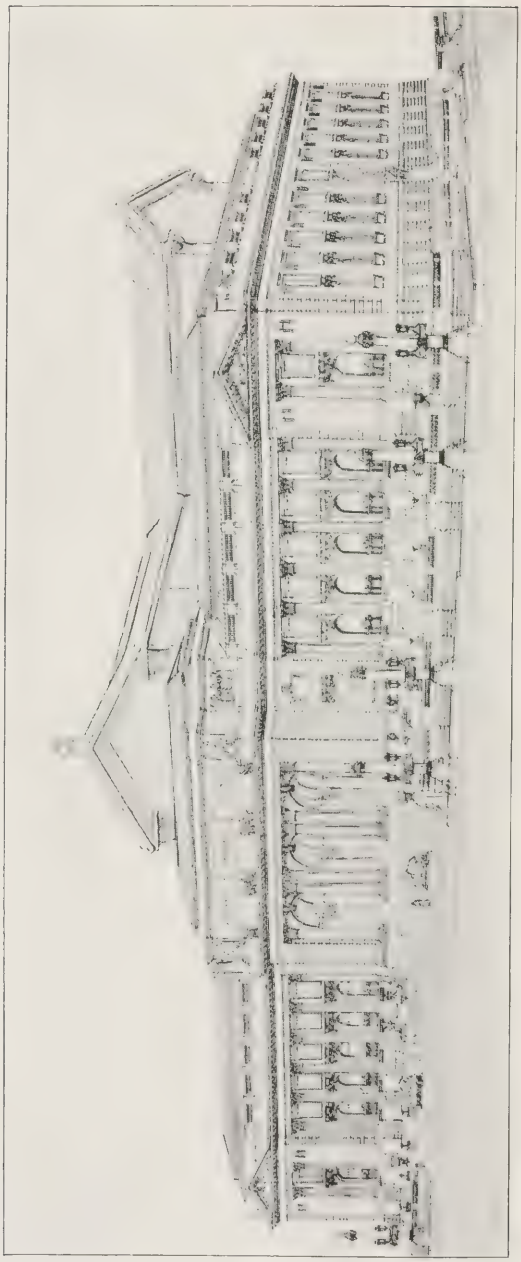
in front, which may be closed by means of a slide. A catalogue of the photographic collection may also be used in like manner.

The value of this Museum (I have only laid stress upon a portion of it) is, notwithstanding its youth, very great, and its further development will be still more remarkable, as more objects of art are constantly flowing into the New World from the Old; so, in studying the art history of Europe and Asia, the collections of the United States may not in the future be overlooked.[b]

[a] Two catalogues of this collection have since been published, with illustrations.

[b] We may here add some remarks which could not be so well embodied in the text:

The buildings lie in about the same direction as the Natural History Museum. The new building did not appear to me to be very happily joined to the old one. In the old building the entrance of the light through the windows is unnecessarily obstructed by the division of the windows into two parts and their shaded interior position. The exhibition in the great middle hall gives an unpleasant impression,



NEW YORK PUBLIC LIBRARY.
Sketch of building in course of erection.

4. NEW YORK PUBLIC LIBRARY—ASTOR, LENOX, AND TILDEN FOUNDATIONS.

This library originated in 1895 by combining the Astor Library, which was founded in 1849 and opened in 1854, and the Lenox Library, which was founded in 1870 and opened in 1878, with the Tilden bequest (1887) of $2,100,000 and 20,000 volumes for a public library. From plans drawn by Carrère and Hastings there is now being erected in the best part of the city (Fifth avenue) a magnificent, monumental building, which is to be completed in about four years, at a cost of $2,000,000 to be paid by the city through authority of the government of the State of New York in Albany. Five hundred thousand dollars were made available for the purpose in 1899 as a first instalment. As the two libraries named will soon disappear as such, only a few remarks concerning them will suffice.

The Astor Library, in Lafayette place, near the busiest portion of the principal street (Broadway), is supported by the bequests and donations of the Astor family, amounting to $1,750,000. It is located in a two-story (in the middle portion three-story) building of red brick in Romanesque style, 200 feet long and 100 feet wide, which was built in three sections between 1853 and 1881. The Tilden Library is also installed here. The library consists of about 350,000 volumes, most of them of rather a general character, and 100,000 pamphlets, besides incunabula, manuscripts, and autographs. One peculiarity is noteworthy, that the books, arranged on the shelves according to subjects, are accessible to the public with certain limitations; but at present this

especially on account of the arched ceiling, like that of a railroad station, which is not relieved by the decorations. The unsystematic arrangement and the incompleteness of the collections is fully explained by their newness. Considering the magnificence of the collections it would be ungracious to dwell upon their faults, particularly as these objectionable conditions are improving from day to day. I mention the lack of good arrangement because it may partly be explained from the fact that many gifts have to be accepted and placed on exhibition in order not to lose patronage—an evil which is met with in many American museums. Such elements as do not fit in a collection can only be culled out after the lapse of many years.

The importance of the comprehensive and celebrated Cyprian collection can not be fully appreciated on account of its unscientific arrangement. The finds are separated (they probably were never kept together) and there exists no chronological sequence at all. The Oriental, Grecian, and Cyprian types in the vases, terra cottas, glasses, and stone sculptures are everywhere mixed together. Unfortunately no information whatever is given the visitor by labels. He does not get much more from the handbooks, since these are limited to brief descriptions. They are, indeed, welcome but not sufficient for an understanding of such objects. One must, therefore, regret not being able to derive the full benefit from this fine collection, even after several visits, which it should be capable of affording. The unsystematic arrangement of the collection is also particularly striking in the room on the second story devoted to precious ornaments. On the other hand, care has been bestowed upon harmony of arrangement in the entire museum, so that the general impression produced is one of pleasure and grandeur.

privilege is somewhat restricted on account of the overcrowded condition of the library. It may further be remarked that the newest acquisitions are placed together on a bookstand, and are freely accessible to readers. The furniture is of wood. Only a few iron shutters and fire extinguishers serve as a protection against fire. It is open daily, except Sundays and holidays, from 9 to 6, and is lighted at dusk by electricity. Children under 15 years of age are admitted when

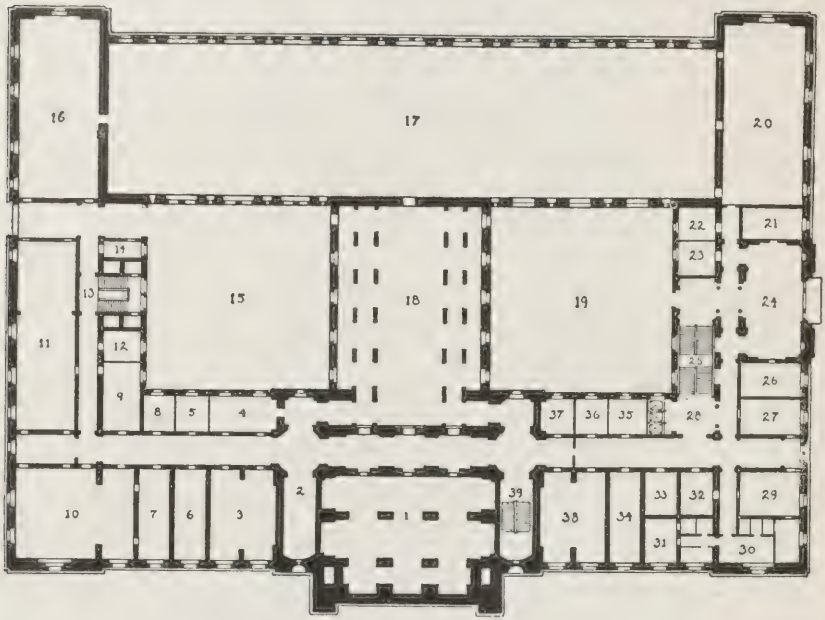


FIG. 13.—New York Public Library. Plan of basement.

BASEMENT PLAN.

1. Storerooms.
2. Telephone.
3. Lunch room.
4. Workshop.
5. Storeroom.
6. Lunch room.
7. Bookbinding stores.
8. Toilet room.
9. General stores.
10. Bindery.
11. Printing room.
12. Toilet room.
13. Stairways.
14. Watchman.
15. Open court.
16. Packing room.
17. Stack room.
18. Machinery.
19. Lending delivery room.
20. Patents room.
21. Bicycles.
22. Parcels or coats.
23. Parcels or coats.
24. Entrance hall.
25. Stairways.
26. Parcels or coats.
27. Extra room.
28. Elevators.
29. Janitor's apartments.
30. Janitor's apartments.
31. Stores.
32. Stores.
33. Stores.
34. Stores.
35. Scrub women.
36. Stores.
37. Stores.
38. Stores.
39. Stairways.

accompanied by grown persons. Umbrellas and canes are checked free of charge. Fees for this service are not expected. Books can be examined only in the library itself. There are 219 seats, a certain portion of one of the three great reading halls being reserved for ladies. From July 1, 1898, to June 30, 1899, 358,000 volumes were used by 85,000 readers (an average of 247 daily), apart from the reference library of 4,500 volumes, which is freely accessible to everybody

in the reading rooms. In the year named only 4 volumes disappeared. About 100 persons are employed in the library. It has published a few annual reports, several indexes and lists, and eight volumes of a catalogue with supplement (1861 to 1888), which, however, extends only as late as 1880.

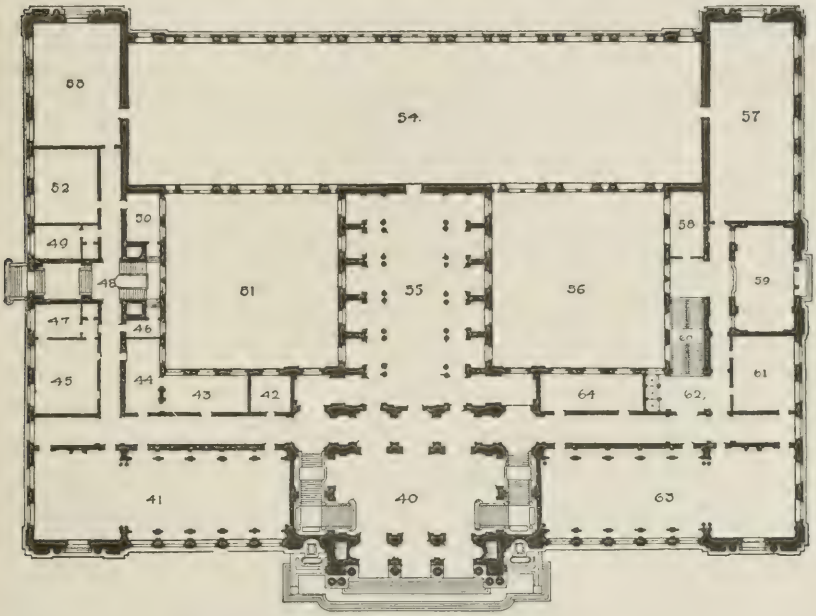


FIG. 14.—New York Public Library. Plan of first floor.

FIRST FLOOR PLAN.

40. Entrance hall.
41. Children's room.
42. Extra room.
43. Reception room.
44. Reception room.
45. Business superintendent.
46. Telephone.
47. Business superintendent.
48. Stairways.
49. Extra room.
50. Extra room.
51. Open court.
52. Extra room.
53. Receiving room.
54. Stack room.
55. Exhibition room.
56. Upper part of lending delivery room.
57. Newspapers.
58. Extra room.
59. Entrance hall.
60. Stairways.
61. Reading room.
62. Elevators.
63. Periodical room.
64. Library for the blind.

The Lenox Library occupies a detached position in the best part of the city on Fifth avenue opposite Central Park. It contains also collections of different sorts. It is of two stories, fireproof, of white sandstone, with two one-story wings projecting at right angles. In the style of the École des Beaux Arts, it is recognized as one of the best specimens of later Parisian architecture, being of imposing appearance within and without, with the exception of the great covered steps leading to the entrance. The book stacks are of iron.

The library contains 150,000 volumes, particularly Americana, Bibles (10,000 volumes), Shakespeareana, and music, besides about 75,000 pamphlets, 600 manuscript volumes, 600 volumes of incunabula, 50,000 letters, 4,000 maps, etc. Nothing is lent out. There are 25 employees. The visiting hours, etc., are the same as in the Astor Library. After dusk the library is lighted by electricity and open to visitors. There are 108 seats. In 1898-99, 68,000 volumes were used by 26,000 readers

FIG. 15.—New York Public Library. Plan of second floor.

SECOND FLOOR PLAN.

65. Upper part of entrance hall.
66. Class room.
67. Special reading room.
68. Extra room.
69. Trustees' room.
70. Director.
71. Director.
72. Extra room.
73. Order room.
74. Extra room.
75. Stairways.
76. Extra room.
77. Cataloguing room.
78. Accessions.
79. Open court.
80. Stack room.
81. Bibles.
82. Special reading rooms.
83. Open court.
84. Public documents.
85. Toilet room.
86. Toilet room.
87. Special reading room.
88. Stairways.
89. Music room.
90. Elevators.
91. Maps.
92. Special reading room.
93. Special reading room.
94. Special reading room.
95. Gallery.

(an average of 84 daily), besides the use of the great reference library of 5,000 volumes in two reading rooms. Only two books were stolen and 25 mutilated in the two libraries together.

On the second floor there is a gallery of 400 paintings, for the most part modern—among them works by Becker, Bierstadt, Rosa Bonheur, Bouguereau, Brožik, Church, Constable, Copley, Corot, Delaroche, Detaille, Diaz, Gainsborough, Gérôme, Hübner, Huntington, Inness, Knaus, the two Koekkoeks, Landseer, Leslie, Lessing, Madrazo,

Meissonier, Munkácsy, Pine, Reynolds, Schreyer, Stuart, Troyon, Turner, Verboekhoven, H. Vernet, Vibert, and Wilkie. There is also a small collection of statuary and prints; and, finally, some minerals, ceramics, glass, etc., in wooden cases. The number of visitors to the museum was 34,000.[a]

The Lenox Library published or printed between 1879 and 1893, seven Contributions to a Catalogue of the following contents: The Hulsius collections of voyages; the Jesuit relations; the voyages of Thévenot; the Bunyan, Shakespeare, Milton, and Walton collections; also the letter of Columbus on the discovery of America (1492), as well as catalogues of paintings of the Lenox and Stuart collections, and twelve short title lists.

The new library, which embraces the two just described and the Lenox collection, and has been administered as the new library since 1896, is controlled by a director, under a board of trustees of 21 members, with a president at its head, and also 5 committees, nominally controlled by the University of the State of New York. (See Albany.) All the following applies to the Astor, Lenox, and Tilden libraries together. The New York Public Library will soon be increased by a great distribution section, which will include all the public libraries belonging to the city. New York has too long been without such a central library. More than 600,000 books and pamphlets are now accessible and about 75,000 are not yet installed.[b] In 1899 more than 115,000 readers called for over 500,000 volumes, without including the reference library—an average of 347 readers daily. In the year named the extraordinarily large increase of almost 165,000 volumes and pamphlets was recorded. The average annual increase is now estimated at over 50,000 numbers; 3,925 periodicals were received,[c] of which 1,207 were American and 909 German; 819 of these were donations. There were 148,000 parts of periodicals consulted during last year, an average of more than 500 daily.[d] The annual increase amounts to 6,400 numbers, including 48 dailies, 543 weeklies, 1,075 monthly and 580 yearly papers.[e] All of these are purchased. In 1899 more than 91,000 volumes and pamphlets were catalogued on 225,000 cards. The catalogue of the reading room, accessible to all, contains

[a] New York has three public picture galleries: Those of the Metropolitan Museum, Brooklyn Institute, and Lenox Library. Of prominent private galleries I may mention those of C. T. Yerkes, H. O. Havemeyer, G. W. Vanderbilt, G. Gould, and W. A. Clark.

[b] In 1902 there were 777,768 books and pamphlets in the library. The Berlin Library has over 1,000,000 volumes and manuscripts, the Paris Library nearly 3,000,000, the British Museum from 4,000,000 to 5,000,000.

[c] In 1902, 4,495.

[d] In 1902, 226,396 current periodicals were called for, being a daily average of 750.

[e] In 1902 the average of separate numbers of periodicals (excluding annuals) received daily was 280, the total number for the year being 86,800.

up to the present 600,000 cards, with author and subject entries in alphabetical sequence. The author and subject catalogue now includes only half of the library. Two hundred thousand volumes and pamphlets are covered by an author catalogue only, while 50,000 are still uncatalogued. The catalogue system is new and will be published later. The library now makes a specialty of official publications of governments and public administrations of all countries, as well as

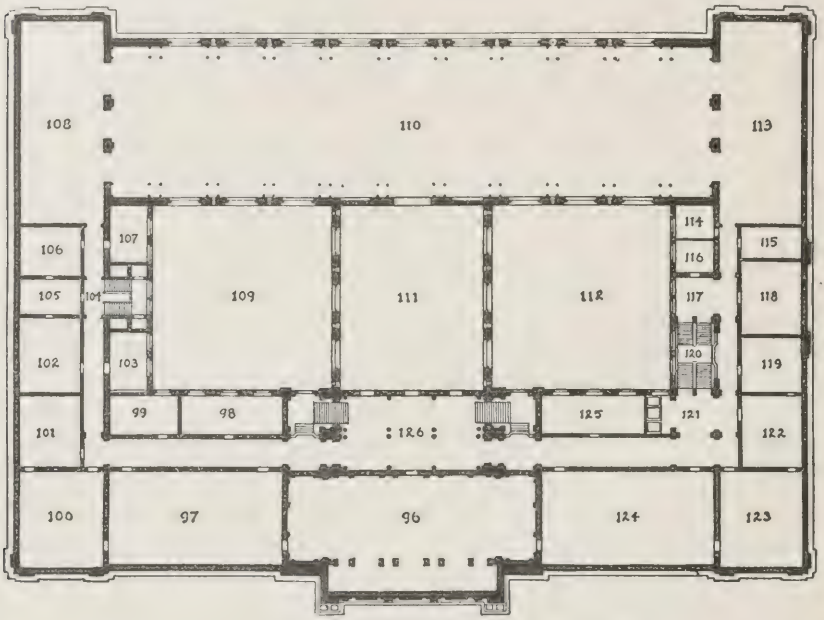


FIG. 16.—New York Public Library. Plan of third floor.

THIRD FLOOR PLAN.

96. Stuart collection.
97. Collections and exhibits.
98. Special reading room.
99. Toilet room.
100. Collections and exhibits.
101. Collections and exhibits.
102. Manuscripts.
103. Extra room.
104. Stairways.
105. Manuscripts.
106. Manuscripts.
107. Extra room.
108. Reading room.
109. Open court.
110. Reading room.
111. Reading room.
112. Open court.
113. Reading room.
114. Extra room.
115. Photographer.
116. Toilet room.
117. Stair landing.
118. Special reading room.
119. Special reading room.
120. Stairways.
121. Elevators.
122. Picture gallery.
123. Picture gallery.
124. Picture gallery.
125. Special reading room
126. Hall.

everything relating to societies. A monthly bulletin, the fourth volume of which is in course of publication, which annually amounts to 500 pages, gives an account of what is done in the library, specifies monthly the most important acquisitions, contains bibliographies, copies of documents and letters, etc. A handbook of 64 pages relating to the New York Public Library was recently published (1900). Tolerably full instruction in library science is also given.

With so comprehensive a programme, such lofty aims, and consider-

ing the inclination of the Americans toward greatness, it need scarcely be said that the new building has been planned on a corresponding scale. It is about 350 feet long, 250 feet wide, 68 feet high in front, 98 feet in the rear (that is, about the size of the German Reichstag building), with two open courts, each 81 feet square. It consists of three stories and a basement, connected with one another by elevators and stairs. It is fireproof throughout. This library differs from many others in not having the main reading room situated centrally in a lofty, spacious hall, as is generally the case, but in the back part of the topmost story, occupying, in several sections, almost the entire length of the building.[a] It is also noteworthy by having the iron bookstacks, seven stories high, located under this main reading room, beginning in the basement. They are 270 feet long, 72 feet wide, and altogether 53 feet high, affording space for 1,250,000 volumes, while another quarter of a million can be provided for elsewhere. The delivery desk for these is located in the middle of the main reading rooms, connected with the underlying bookstacks by means of book lifts. The rooms for lending books outside of the building are situated in one of the courts in the basement and ground floor. A possible extension of the library to a capacity for 5,000,000 volumes is provided for by the park lying behind the building. There will be about 800 seats in the main reading room, besides about six special study rooms in the third story and seats in the special libraries (Government publications, Oriental literature, sociology and political economy, mathematics, physics, chemistry, maps, music, Bibles). There is also a reading room for children and a newspaper and periodical room in the second story. The whole manuscript section is as a safe for itself. The power plant will be located outside of the building. The other details may be seen in the ground plans.

The land, buildings, and books of the united libraries are worth about $3,600,000. There is, besides, an invested fund of $3,000,000, yielding $125,000 interest, seven-eighths of which is applied to administrative purposes. After the completion of the new building, however, ample provision will be made by the city for running expenses.[b]

There can be no doubt that the New York Public Library, under the administration of Dr. John S. Billings, who has been director since 1896, will become a model institution, and, supported by the liberality of the rich New Yorkers, it will be a magnificent ornament to the great city.

[a] This is also the case in the Chicago Public Library.

[b] Since Mr. Carnegie has, in 1901, presented $5,200,000 for 65 branch libraries in New York, the task of the public library has been enormously increased, as they are all to be under the administration of the New York Public Library. Already, in 1902, 2,000,000 books were in circulation for home use from 17 branch libraries.

5. COLUMBIA UNIVERSITY.

The founding of King's College by royal patent of George II dates back to 1754 before the Declaration of Independence of the United States of America, in 1776; therefore the university is one of the oldest organizations in New York. In 1897 it was removed to Morningside Heights, in the northern part of the city, between One hundred and sixteenth and One hundred and twentieth streets and Tenth and Eleventh avenues, except that the medical faculty (College of Physicians and Surgeons, founded in 1807), and incorporated in 1891, remained in its three buildings in Fifty-ninth street, 3 miles away where it had in 1887 acquired model new buildings and furnishings, provided almost entirely by the Vanderbilt family at a cost of $2,500,000, among them an anatomical laboratory for 400 students, a model of its kind. I here treat only of the new university, which was erected in a uniform style from maturely considered plans, and, besides many other advantages, already before completion, possesses two especial attractions—the power house and the library. The university occupies its third location since it was founded as King's College, almost one hundred and fifty years ago, and the medical faculty its sixth. This frequent removal might at first sight appear to be a disadvantage, but has in fact proven to be a great advantage, because, pushed farther and farther outward by the growth of the city, the new buildings could in their new locality always be made to conform to the altered conditions, whereas elsewhere such new buildings can generally be acquired only after long periods.

The university occupies an isolated position on an elevated tract, where presumably it will suffice the wants of the next generations, and even after the adjacent portions of the city are more closely built up, it will still occupy a comparatively open position, not in direct contact with the city's noise and traffic. It occupies historical ground, as a battle was fought there in 1776 during the war of the Revolution against England. In 1812, also, fortifications were erected here during the second war with England. After 1825 an insane asylum occupied the site. In 1892, at a cost of $2,100,000, an area of 16½ acres was acquired by the university on this rocky hill for a new site. The nature of the ground admitted of making a plateau 750 by 575 feet that is, somewhat more than three-fifths of the entire tract 150 feet above the near-by Hudson, and 25 feet above the streets; in size about the same as the Dresden "Zwinger," with its surrounding gardens. It is, therefore, not so very large and is smaller than the site of the Natural History Museum, 2 miles away. In 1893 the university purchased at the Chicago World's Fair for $3,500 the university plans sent there by the Prussian educational department, which now hang on the walls of the architectural section of the library; and in 1894 it accepted the building plan

worked out by the architects, McKim, Mead & White, for the buildings in the Italian Renaissance style. According to this plan 14 separate buildings lie to the right and left of the library in four groups.

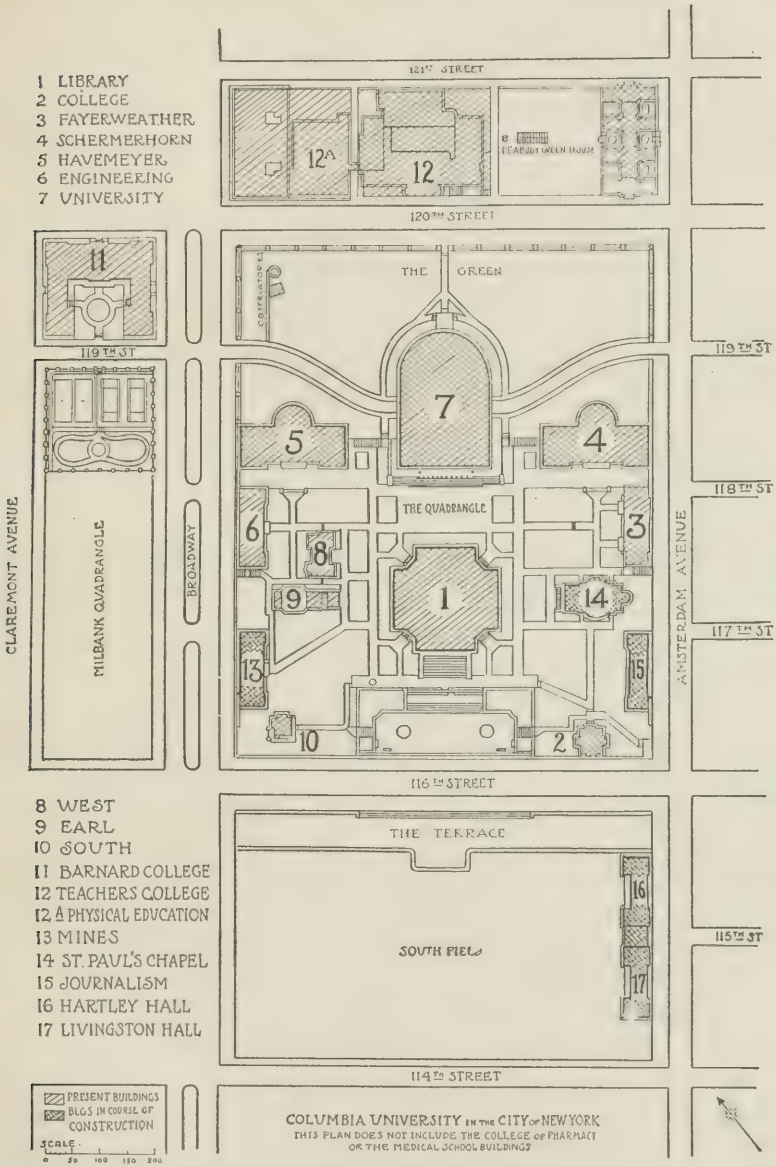


FIG. 17.—Columbia University. General plan of University buildings.

embracing as many courts. Behind it is the University Hall, 300 feet in length, containing a theater (for 2,500 persons), a dining hall (for 600 persons), the gymnasium, and the power plant for the entire univer-

sity. A handsome model of University Hall is exhibited in the Metropolitan Museum of Art, a mile and a half away. Only the front part of the hall rests on the plateau itself, the main portion of the building extending along the back slope of the plateau, which has a steep descent of 38 feet, so that in the rear the structure rises to an imposing height of 136 feet, while in front it is 69 feet high. These lower-lying portions of the site, affording a park-like green with old trees, are to be inclosed by four dormitories.[a] The buildings are 69 feet high, the outer ones having four stories and two basements, which is made possible by the sloping nature of the ground.

Four of the great outlying buildings for lecture rooms, laboratories, and collections are completed; also the library and the power plant of the university hall, and the gymnasium with its baths. The foundation, stairs, balustrades and the like are of granite; the library is of white sandstone; everything else is of red-brick construction with sandstone trimmings. The walks are paved with red brick. The whole makes an imposing as well as an agreeable impression, gay in summer from the green color of lofty trees and grass plats. Everything is fireproof; the framework is of iron; the floors, walls, and roofs are of hollow brick; the stairs are of stone or of iron and stone. The iron pillars rest in sheet-iron sockets, which are filled with loose asbestos. The doors and window frames are of wood; the windows are of plate glass. Everything is done according to the expressed principle that the best is not too good and is in the end the cheapest.

The buildings hitherto erected cost $4,250,000;[b] those yet to be put up will require $5,500,000. The total cost of the university buildings will amount to $15,000,000,[c] and they will accommodate 6,000 students and 600 teachers. Already the aggregation of buildings—Columbia University, National Academy of Design, Grant Mausoleum, St. Luke's Hospital, and St. John's Cathedral—splendidly situated on the high bank of the Hudson in the midst of carefully tended parks, is regarded as the future "Acropolis of the New World."

Columbia is exclusively an endowed university, and although it has the authorization of the State of New York for its founding, it has never received a State appropriation. That such a considerable sum for a university can be raised entirely by private subscription is characteristic of Americans and is an argument for the social justifica-

[a] See illustrations in *Columbia University Quarterly*, I, 1899, p. 149. Two five-story buildings are planned 156 feet in length, and two 200 feet in length and 40 feet wide, which will accommodate altogether about 450 students, and will cost about $750,000.

[b] An exact statement of the cost may be found in the report of the president of October 3, 1898, reprinted in report of the Commissioner of Education, 1897–98, II, p. 1797, Washington, 1899. See also *Science*, XIII, p. 116, January 18, 1901.

[c] The Strassburg University buildings cost $3,750,000.

tion of their proverbial wealth.[a] In America the obligations imposed by the position of wealth are well discharged. Columbia is governed privately by self-chosen trustees, and is only nominally subject to the control of the regents of the University of the State of New York in Albany. It now has an annual income of $400,000 from its endowment of $12,000,000, and tuition fees amounting to $375,000. Its current expenses amounted in 1899 to $837,500[b]; such a deficit of $62,000 is, however, of no consequence, since persons are always found who make it good. Nor is a momentary debt of $3,000,000 very oppressive, as it will soon be paid. In 1899 a number of benefactors together contributed $75,000 for current expenses alone and $500,000 for endowment funds, besides a hospital worth over $500,000 with an endowment of $375,000. The current annual expenses of the University of Berlin amount to $750,000; those of the University of Leipzig, $625,000, of which $500,000 are appropriated by the Royal Saxon Government. The city of New York, with its 4,000,000 population, has about the same number of inhabitants as the Kingdom of

[a] I cite only a few of the great university endowments. The dates given in parentheses indicate the year of founding of the universities mentioned. The Stanford family gave $30,000,000 (1891); Johns Hopkins (1867), $3,750,000; J. G. Clark (1887), $3,000,000; W. C. de Pauw (1837) and J. B. Colgate (1819), $1,500,000 each; J. N. and H. Brown (1764), $750,000 each for the university bearing the name of these founders; J. D. Rockefeller (1866), $10,000,000 for Chicago; S. Cupples and K. S. Brookings (1900), $5,000,000 for Washington in St. Louis; the Vanderbilt family, $3,750,000 for Vanderbilt University (1872) and Columbia, in New York; J. Rich and A. Packer, $2,000,000 each for Boston (1869) and Lehigh, in South Bethlehem (1866); J. C. Green, $1,750,000 for Princeton (1746); Seth Low and J. Loubat, $1,500,000 and $1,250,000, respectively, for Columbia (this university received in the last ten years endowments amounting altogether to $7,000,000); E. Cornell, H. W. Sage, and O. H. Payne, $3,500,000 for Cornell (1865); J. Lick, $750,000 for Berkeley (1868). Yale, in New Haven (1701), received $5,000,000 from different donors; Wesleyan University, in Middletown (1831), $2,000,000; Cincinnati (1819), $1,500,000; Harvard, in Cambridge (1636), receives on an average $1,000,000 to $1,250,000 every year (last year $1,625,000), etc. G. Peabody gave $6,000,000 for various scientific institutions; D. B. Fayerweather, $5,250,000. This makes a total of between $100,000,000 and $125,000,000, and yet is only a fraction of such gifts for universities and scientific institutions, as may be seen from the list given in the New York World Almanac, 1900, p. 310. In the year 1899 alone about $75,000,000 were donated for universities, colleges, schools, and libraries. E. D. Perry (Education in the United States, edited by N. M. Butler, Albany, 1900, p. 304) says: "It is truly encouraging for the future of education in America that so many of her millionaires are willing to give freely of the fortunes that they have accumulated, and that those who give the most should set the example of intrusting the application of the funds to those who best understand the needs to be met." [The above lists were made up in 1900, but would be considerably enlarged to-day. Mr. Carnegie alone has given away $100,000,000.]

[b] These figures are only approximate. I may mention for comparison that the annual current expenses of Johns Hopkins University, in Baltimore, amount to only $200,000.

Saxony. Leipsic has 3,500 students, Columbia University about 4,000, of whom, however, only about 2,000 correspond to our students. These remarks are merely thrown in without any desire to compare the two universities.

There is an extraordinary difference among American universities. About twelve or fifteen correspond to our twenty-one German universities, and even these can not be compared without hesitation, because they combine with the university to a greater or lesser degree some of our "gymnasium" classes, and stand, moreover, upon quite different stages of development. Almost every American university has a college,[a] which in its first two or three years corresponds somewhat to our "obersecunda" and "prima," and only in its last years to the first year of our universities. On leaving college the student, after passing an examination, receives a degree of bachelor of arts, or the like, and, if he so chooses, then enters the university proper, which is organized into faculties ("schools") as among us. The individual who leaves college in order to begin his life work possesses, therefore, a higher education than our young men who leave the gymnasium for the university. After attending the university for two years the student obtains the degree of master of arts, or the like, and after one or more additional years of study, the degree of doctor. The students at American universities are accordingly divided into undergraduates (in the college), graduates or postgraduates (university students in the more restricted sense), and special students. The latter are either nongraduates or persons who, after completing their college course, pursue no regular faculty studies, but immediately apply themselves to special studies, which lie without the scholastic organization. The American student is permitted to pursue special studies earlier than the German student, and the students in general have a relatively free choice of their lectures, as in the German universities, which is also already more or less the case toward the close of the collegiate course.

A person thoroughly acquainted with German and American universities, Prof. H. Münsterberg, of Cambridge, Massachusetts, once declared (*Der Western*, Chicago, December 3, 1893), with regard to Harvard, that the examination for the degree of doctor of philosophy as the last period of the graduate school (that is, the philosophical faculty) represents a stage of scientific maturity far above the level of the average German doctor; that the examination for doctor in Harvard was more like the German examination, which admits the young scholar to the office of an academical teacher ("Privatdocent"), than

[a] Lately students have been admitted to Columbia without knowledge of the Latin language, so that there the rudiments are also taught.

like the German examination for the degree of doctor.[a] This equality with German universities applies, however, only to a very small proportion of the 150 American scholastic institutions that call themselves universities, to say nothing of the 350 colleges.[b] Besides Harvard in Cambridge it may perhaps apply to the following: Chicago, Columbia in New York, Yale in New Haven, Cornell in Ithaca, Pennsylvania in Philadelphia, Michigan in Ann Arbor, Wisconsin in Madison, California in Berkeley, and Stanford in California. Johns Hopkins in Baltimore has virtually dispensed with a "gymnasium"-like collegiate preparation, and consequently most nearly resembles a German university, to imitate whose organization an avowed tendency exists in many American universities. Princeton, indeed, possesses a college, but only a philosophical and theological faculty. The twelve here mentioned (Harvard, Johns Hopkins, Yale, Columbia, Cornell, Chicago, Stanford, California, Princeton, Michigan, Wisconsin, and Pennsylvania) have quite recently formed a closer union. Clark University in Worcester comprises a philosophical faculty with 11 teachers and 34 students (1900), and recognizes the pursuit of science as its first object, with teaching as somewhat subordinate.[c] Thus every one of the American universities ought to be especially characterized. We can not in general speak of the universities of the United States as we do of the German universities. These matters are known to every educated American, and nothing is more preposterous than to look at all of these universities of the Union as alike. I must let the matter rest here with these few general remarks, but refer the reader particularly to the chapter The American University in the work entitled Education in the United States, edited by N. M. Butler, Albany, J. B. Lyons Company (1900), I, pages 249–319.

Columbia University has the following six special faculties to govern Columbia College:

Juridical faculty, school of law, for common law.[d]

Medical faculty, school of medicine.

Philosophical faculty, school of philosophy, for philosophy, philology, literature.

[a] Quite recently, and after a longer experience in America, Professor Münsterberg confirms this statement in the following words: I have no doubt that the doctor degree in Harvard ranks higher than in any German university. It occupies a medium place between the German doctor examination and the examination for the position of academical teacher, in part also corresponds to the German civil-service examination. (*Zukunft*, No. 35, 1900, p. 389.) Prof. P. Haupt, of Baltimore, in a letter addressed to me confirmed this with reference to Johns Hopkins.

[b] For a better understanding of this subject, Münsterberg's remarks in the above-cited excellent paper, American Universities, in *Zukunft*, No. 35, 1900, p. 385, may be consulted.

[c] *Science*, 1900, p. 621.

[d] See also *Columbia University Quarterly*, I, 1899, p. 135.

Political economy faculty, school of political science, for history, national economy, public law.

Natural science faculty, school of pure science, for mathematics and natural science.

Technical faculty, school of applied science, for mining and metallurgy, chemistry, engineering, architecture.[a]

Here, therefore, we have a technical high school combined with the university. The tendency to spread out in this direction has recently developed more or less among our German universities. Columbia College is not strictly separated from Columbia University. Undergraduates—that is, students of the college—may take certain courses of the university.

Two other institutions are closely connected with Columbia, namely, Barnard College and Teachers' College.[b] Both are near by, separated only by the width of a street, but on their own ground. Barnard College is intended for women, and corresponds to Columbia College for men. Teachers' College is a seminary for male and female teachers on a university basis. Barnard College was founded and endowed in 1889 by former President Barnard of Columbia. It is an independent corporation, but the courses of instruction and examination are prescribed by Columbia, and Columbia professors lecture in the institution besides others appointed by Columbia. Students of Barnard College may also attend certain advanced lectures in the university and take university degrees. Teachers' College was founded in 1888 and united with the university in 1898. Certain lectures may also be attended by Columbia students. These two colleges, therefore, form part of the university, have the university president as president of each, but are financially quite independent. Their budgets are not included in the figures given above.[c] Their students, however, are included in the foregoing estimate. Barnard College has 317 students, and Teachers' College 365, besides 750 whose relations to the establishments are not so intimate, while their professors also lecture outside of the colleges. The university itself had in 1899–1900 2,456 students, of whom 460 were undergraduates, 1,996 graduate students, and 30 nongraduates, making a grand total of 3,888.

Columbia is less intimately connected with the Union Theological Seminary on Sixty-ninth street, about 3 miles distant; with the American Museum of Natural History, where, among others, the laboratories for anthropology and paleontology are located, with the Metropolitan Museum of Art, both in Central Park, about 2 miles distant, and with the New York Botanical Gardens in Bronx Park, about 5 miles from the university buildings, where also the her-

[a] See also *Columbia University Quarterly*, I, 1899, p. 241, and II, 1900, p. 242.

[b] For the latter see also *Columbia University Quarterly*, I, 1899, pp. 323 and 342.

[c] Quite recently $1,000,000 were donated to Teachers' College for dormitories.

barium and a portion of the botanical library of the university are deposited, and where the more advanced botanical laboratory courses are held. In July and August summer courses of thirty lectures each on ten topics are delivered in the university. At the instance of the New York Chamber of Commerce, a commercial high school will soon be organized. Finally, during the winter, the professors give free public courses of lectures in the two museums above mentioned and in Cooper Union, a great free institution for the dissemination of learning, with 3,500 students and 2,000 daily readers in the library connected with it. Numerous scientific societies hold sessions now and then in the rooms of the university, such as the National Academy of Sciences, the American Association for the Advancement of Science, with its nine sections, and also the American Astronomical and Astrophysical Society, the American Chemical Society, the American Mathematical Society, the American Physical Society, the Geological Society of America, the American Entomological Society, the American Forestry Association, the American Society for the Promotion of Engineering Education,[a] and others. It is, therefore, a center of greatly divergent and broad intellectual interests.

At the head of the university is a president, under a board of 22 trustees, who form a self-perpetuating body and appoint the president. At the same time 5 committees on finance, buildings, promotions, instruction, and library officiate. The university employs 85 regular and 14 special professors,[b] 240 assistants, etc., and 12 administrative officers, besides 150 persons under the superintendent of buildings.

[a] New York itself is the seat of many scientific societies. Only the following need be named (from Education in the United States, edited by N. M. Butler, Albany, II, 1900, p. 872): The New York Academy of Sciences, founded in 1817, whose four sections (astronomy and physics, geology and mineralogy, biology and anthropology, and psychology and philology) meet monthly. (On the 23d of October, 1899, I attended an interesting session of the section for anthropology and psychology, which was held together with the Anthropological Club, with Prof. Franz Boas as chairman.) The academy also holds general sessions. Every year a reception is given, with demonstrations of scientific progress. It publishes octavo annals and quarto memoirs. Its library contains 18,000 works. A scientific alliance includes the academy and the following local societies: Torrey Botanical Club, New York Microscopical Society, Linnean Society of New York, New York Mineralogical Club, American Mathematical Society, New York section of the American Chemical Society, and the New York Entomological Society. It is the intention to erect a central building for this scientific alliance. The Preliminary List of American Learned and Educational Societies, published by the Bureau of Education in 1896, enumerates 62 scientific societies in New York.

[b] The position of the "Privatdocent" is not known in Columbia, nor in any American university. I may mention that the professors of American universities generally take a year's leave of absence on half pay every seven years, but may divide such leave of absence through several years. This may have turned out to be a necessity, inasmuch as a prolonged journey in Europe is of the greatest importance to most of them. A similar privilege ought, however, also to be granted to the European professors.

among them technologists, since a portion of the new installations and the greater part of the repairs are made on the premises. The university, therefore, employs a staff of over 500 persons, all told.

Each student pays $125 to $200 annually for all instruction. The university authorities estimate his annual expenses in New York at between $375 and $825, according to his requirements—$550 for medium accommodations.[a] Eighty-five fellowships and scholarships are bestowed annually, amounting to almost $60,000, and whoever has attained the degree of doctor of philosophy in Columbia may continue his work in the laboratories free of charge. These fellowships and scholarships vary between $125 and $850, most of them $500, and the holder of fellowships need pay no college fees. A committee of professors aids poor students in order that they may support themselves while pursuing their studies as private teachers, translators, writers, evening school instructors, traveling companions, stenographers, typewriters, etc. The student who asks this aid is respected all the more for it by his colleagues.

The university annually publishes a catalogue, which contains 400 to 500 pages of accurate information, a report of the president, of over 100 pages, catalogues of lectures of each faculty with all possible special data for the students, comprehensive pamphlets of 100 or more pages; and also, beginning in 1899, a Quarterly, which treats only of affairs relating to the university proper. A bulletin appeared from 1890 to 1898. In 1897 a small album of 48 pages was published with many illustrations and plans, entitled "Columbia University," which gives an excellent idea of the whole establishment. Finally, from 1894 to 1900, 16 volumes of a scientific character have appeared in quarto, octavo, and duodecimo (each volume complete in itself), together with serial publications of eleven different departments (contributions, memoirs, or studies), and five periodicals, which are conducted by members of the faculty.

The power plant.—It was planned to build a power house for heating, lighting, ventilating, water, electricity, mechanical power, compressed air, etc., directly on the banks of the Hudson River, but a short distance from the university in a straight line, in order that coal could be unloaded directly from the vessels into the boiler house. The pipes and cables were then to have been led up through a tunnel, but this project was not permitted by the city authorities as the nearby residents thought themselves damaged by such a plan. In consequence of this a handsome boathouse was erected on the ground already

[a] In Harvard the expenses are estimated at $500 to $600, in Yale $700, in Philadelphia $450. Each student costs the American universities from $125 (at Vassar College for women) to $400 (Leland Stanford Junior University); in the German universities the cost averages $175, as estimated from a total expenditure of about $5,750,000 for 33,500 students.

purchased on the banks of the river, the gift of a patron, and the engine house was built under the University Hall in a room 165 feet long, 100 feet wide, and 33 feet high. For this purpose, together with great tunnels to connect all the buildings, the drains, cellars, coal bunkers, and ground floors, more than 80,000 square yards of rock had to be quarried. The machinery is driven by a 4,000 horsepower engine, that requires 13,000 tons of coal a year, 4,000 of which can be stored at one time. In order to protect the buildings from the vibrations of the powerful engines, their foundations were all united on a single wall base separated from the foundations of the buildings; this had the desired result.

The steam-heating apparatus is installed according to the so-called direct-indirect system (that is, radiant heat and warmed ventilating air), and goes through thousands of feet of pipe. The exhaust steam from the engines suffices for heating the library and the University Hall. Automatic thermostats regulate the temperature of all the rooms. The ventilator drives 1,250,000 cubic feet of air a minute through the building. Nowhere is it renewed less than six times an hour, in some rooms twelve times. The piping for water, gas, compressed air, vacuum, etc., is unusually extensive, the chemical institute alone having over 6,000 discharge pipes and connections. Equally enormous is the length of wire conduits for light, power, telephone, electric clocks, signal clocks, watchmen's time detectors, electric elevators, etc. The cost of the machinery, without counting the preparation of the foundations, was $200,000, that is, $50 for each horsepower. The power house itself under the University Hall, including tunnel and coal bunkers, cost $350,000. The heat, light, and electric appliances for the buildings still to be erected will cost $550,000. The whole power system, therefore, will cost about $1,125,000.

The entire power plant was most carefully planned and executed in the highest style with regard to solidity and neatness. The subterranean rooms are excellently lighted and are models of cleanliness—the whole a work of art comparable to the power plant of an immense modern ocean passenger steamer. It should also serve as an object lesson for the technical department of the university. It is managed by 18 men, who work in three relays of eight hours each, and receive $10,000 in wages. The annual expenditure for coal amounts to $14,000.[a] After all the buildings are completed the expenditures for coal will increase to $27,500 and wages to $15,000.[b]

The library will some day form the center of the entire university—an excellent idea. It is situated at the top of a gently rising ground

[a] They are not allowed to burn soft coal in New York, a police regulation which would be very appropriate for Dresden.

[b] See E. A. Darling, The Power Plant of a University, with 27 plates and figures. *Transactions of the American Society of Mechanical Engineers*, XX, 1899, pp. 663–724.

at the head of broad flights of steps. In Romanesque architecture according to the French conception, magnificent with its fine pillared portico and dome rising above the whole, it is worthy of comparison with the best modern buildings of European capitals. Three stories surround an imposing central hall, and the whole rests upon a raised ground floor 200 feet square. The center of the dome is 137 feet above the surface of the ground.

The library also accommodates those faculties whose equipment consists only of books and who, as yet, have no building of their own. Thus, the northern wing belongs almost exclusively to the law faculty. On the second story is the section of the library belonging to that faculty; on the third the reading room, with 140 seats; on the fourth an auditorium for 240 hearers; all three, like the raised ground floor, containing side rooms for administration, seminars, professors, and students; constituting, so to speak, a building for the law faculty within the university library.[a] They are, however, already thinking of erecting a special law building.

The schools of political science and philosophy are in like manner accommodated in the western and eastern wings; only that here, instead of the reading room on the third floor, eight seminary rooms are to be divided into library sections which will serve for the corresponding schools; that is, for philosophy, pedagogics, literature, philology, political economy, public law, and history. Two such seminary rooms for Latin and Greek are located on the second floor. This is an ingenious arrangement, which, so far as I know, has nowhere else been carried out in this manner. A half story of the entire wing forms a single room, the inner three-fifths of which are occupied by 26 bookstacks, for the most part 20 feet long, while the outer two-fifths are empty. One can therefore look through from one end to the other, a distance of 110 feet. In the partition planes of the two-sided bookstacks of 12 by 12 feet run massive sliding doors of oak, reaching to the ceiling, of such dimensions as are perhaps seldom seen. These, however, may be easily handled, and by their means the outer open space may be divided into as many larger or smaller single rooms as may be desired, up to eight each. Every such room is provided with tables and chairs, so that one may sit secluded in the library of any particular branch. This arrangement seems to me as original as it is practical. The library is not so much a storehouse for books as a laboratory for study with books. Exactly as much care has been bestowed upon the reader as upon the books. On the fourth floor of each of these two wings there are four auditoriums, each accommodating 35 to 58 persons, as well as administrative and other side rooms. In the south wing, moreover, there are two auditoriums,

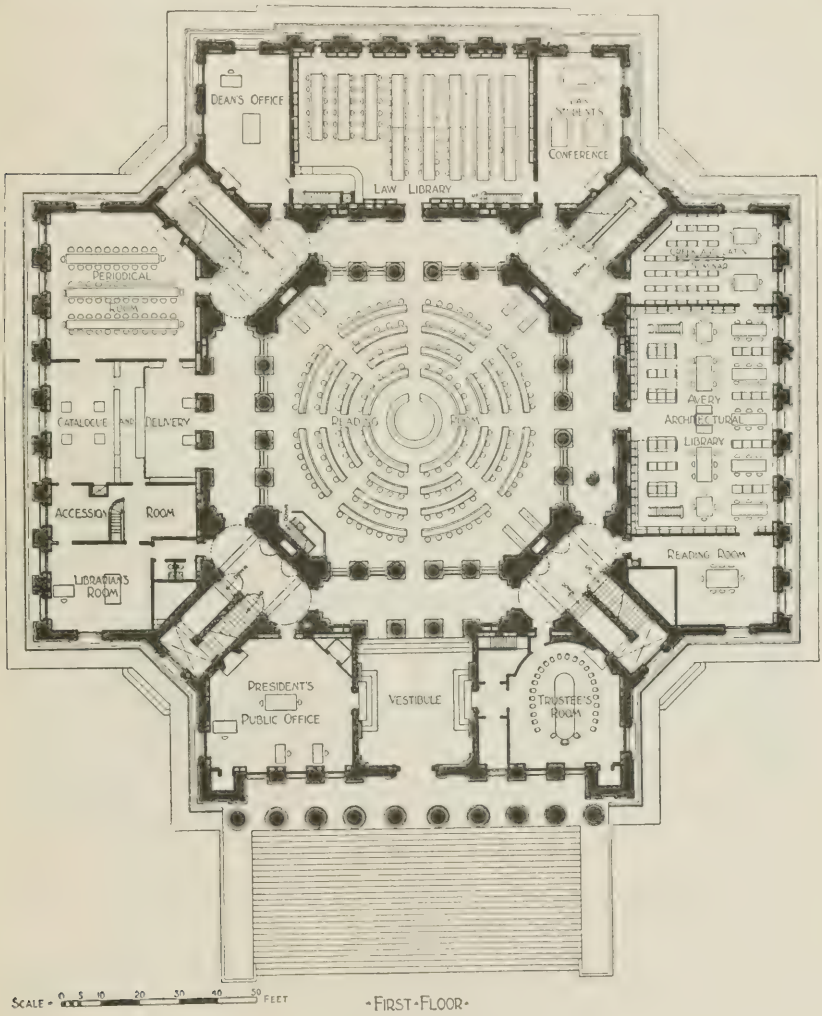
[a] See illustrations in the *Green Bag*, May, 1898, p. 199, and in *Columbia University Quarterly*, 1, 1899, pp. 135 and 141.

COLUMBIA UNIVERSITY, NEW YORK CITY.

Library building.

each for 188 persons. From the upper floors a splendid view of the surrounding region may be enjoyed, as is also the case from the other university buildings.

The library has a total capacity for 1,500,000 books. It contains at present about 300,000, and about 30,000 pamphlets. The increase of



THE LIBRARY

FIG. 18.—Columbia University. Plan of first floor of library.

the last year amounted to more than 25,000. A special donation of $15,000 was received for the purchase of books. It is estimated that the annual average increase will reach 18,000. The bookstacks are distributed in three stories, two stacks always standing one upon another; that is, arranged in each story independently of the others.

With the exception of the round wooden stacks in the rotunda and the old wooden ones in the basement they are of lacquered iron of dark green color, with similar movable veneered shelves (4–7) that may be easily adjusted, so perfectly finished that their surface feels like velvet. I am not acquainted with such excellent work of this kind in Europe.

The repositories have an intermediate space of 2½ feet only, but may be brightly lighted by electricity. They were put up in the beginning without any intention of utilizing the daylight. On the ground floor there are special fireproof vaults for rare books, a provision which is lacking in most European libraries. In the central rotunda,

FIG. 19.—Columbia University. Seminar rooms on third floor of library.

the galleries of which are supported by 16 costly green granite pillars 29 feet high, with gilded Ionic capitals, there are 153 seats. In its entire design and in its artistic ornaments, although the decoration is not yet entirely finished, the rotunda constitutes a great attraction. The reference library comprises 10,000 volumes. The newly-acquired books are deposited for a time in this reference library. An alphabetical card catalogue,[a] arranged systematically and very carefully

[a] The library is arranged and catalogued according to the Dewey system, completed by Cutter (Dewey was director of the library until 1888). Milkau (*Centralkatalog*, 1898, p. 20) writes, after Billings, that the Dewey system is now being replaced at the Columbia University library by another. This, however, is not the case. I was told that they were satisfied with the system and that they could get along very well with it.

prepared, is accessible to everybody. The reading room is open on week days (with only four exceptions during the year) from 8.30 o'clock in the morning till 11 o'clock at night; during the summer holidays (July to September) till 10 o'clock. The library is enviably easy of access. Up to a late hour in the evening everyone has unlimited freedom of reference in all rooms open to the public.

The order cards are forwarded by pneumatic tubes, the books return on small lifts driven by compressed air. In the evening the lofty reading room, in addition to the direct electric lighting, sufficient in itself, is brightened up by a so-called "moon," that is, a great globe suspended in the middle, on which electric light is thrown from the eight corners of the upper galleries and reflected from it. Beside the central hall is located a special library with its own reading room—the architectural library with 16,000 volumes. The valuable folios are kept in a horizontal position in separate iron repositories on copper rollers, and are thus very easily handled without injury to the binding. This arrangement is as perfect and as artistic as that of the above-mentioned bookstacks. I may note also among the special sections, a Goethe library of 1,200 volumes and a Kant library of 600 volumes.

The books are consulted chiefly by professors and students, who are permitted to take them away. Last year more than 77,000 volumes were thus taken out by about 3,000 persons. No record is kept of the attendance within the library, but all the seats in the reading rooms are usually occupied. Outsiders may consult books only in the library itself. Nine librarians and 22 assistants and cataloguers attend to the needs of the library, together with 29 copyists and messengers. Altogether 67 persons are employed, including 33 women.

The building itself is of fireproof construction throughout, but has wooden furniture (except most of the bookstacks) and wooden doors and window frames. The floors are stone, covered partly with parquetry and corticine, a very elastic kind of linoleum.

A wonderful spirit of care and order is everywhere apparent. Even in the anterooms the same elegant solidity prevails as in the sumptuous main rooms. Very few institutions of the kind could be compared with this one.

The cost of the library amounted to $1,250,000, $600,000 of which were for the interior furnishings. It was opened in 1897.

I must refrain from describing in detail the four following buildings with their institutes already completed, and must limit myself to short accounts:

1. The building for natural history and psychology (Schermerhorn Hall) is 215 feet long and 85 feet wide. The two basement floors, the first story, and half of the second story are devoted to mineralogy and geology; the other half of the second story to psychology, with labora-

tories after the Wundt pattern. Psychology is diligently fostered in the universities of the United States even more than in Germany, and Columbia University ranks among the first in this respect. Quite recently J. D. Rockefeller gave $100,000 primarily for the better endowment of this chair. The third story contains seven other rooms for psychology, the remainder for botany. The fourth flour is devoted to zoology. Each of these sections has its museum for instruction, its reference library, its laboratories and lecture rooms (the large one for 250 persons), and the necessary anterooms. This was not carried out according to a fixed plan, but no pains have been spared to adapt every detail to its special objects and to work each out as completely as pos-

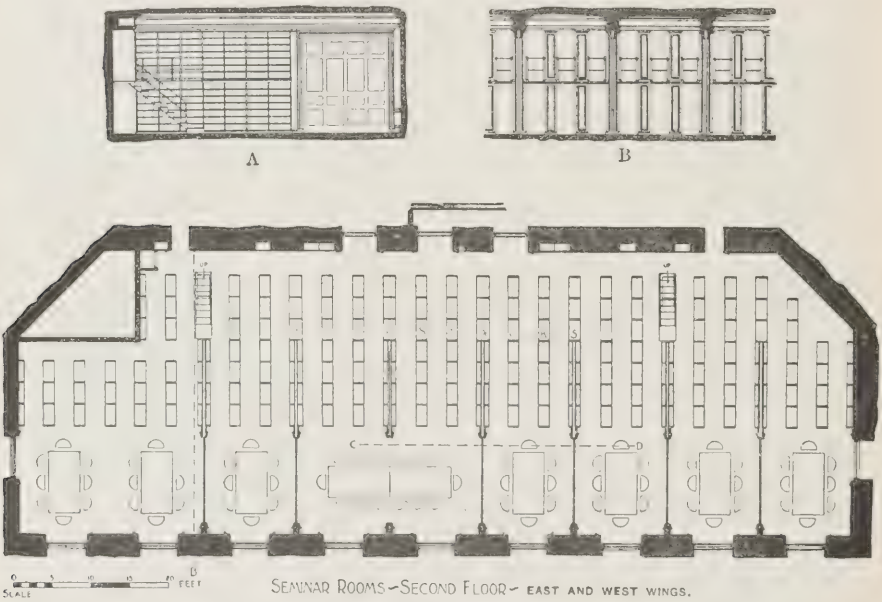


FIG. 20.—Columbia University. Plan of seminar rooms shown in figure 19. A, section through A B; B, section through C D.

sible. Toward this object advantage has been taken of the experience not only of America but also of Europe. The Prussian university plans at the Chicago World's Fair, the purchase of which was mentioned on a previous page, were of special value in this connection. The buildings, which are situated entirely on the plateau, have four stories above the ground floor; those erected on its edge have six on the outer side. The entire furnishings, including the cases containing the collections, the doors, and the window frames, are of wood; in other respects the construction is quite fireproof. The floors of the corridors, the laboratories, and the stairs are partly of marble, partly of other stones, marble mosaic, or asphalt; the floors of the lecture rooms, offices, etc., are of fireproof material, with parquetry of pine

or oak. In the reading and college rooms the parquetry is covered with corticine.

The above remarks apply also to the following three buildings:

2. The building for physics, astronomy, mechanics, English, and rhetoric (Fayerweather Hall) is 155 feet long and 60 feet wide. On the two basement floors, and on the first and second stories, physics is taught, the large lecture room having a capacity for 152; on the third floor is the section for English language and rhetoric with a lecture room for 140 students, and four rooms for 60 each, and the fourth is devoted to astronomy and mechanics, with one lecture room for 100, and three for 50 each.

3. The building for chemistry and architecture (Havemeyer Hall) is 215 feet long and 85 feet wide. On the two basement floors, metallurgy is taught; on the first to the third stories, chemistry (the lecture room for 325); on the fourth, architecture, with a large drawing room for about 150 students and a library, museum, lecture rooms, and special study rooms.

4. The technical building (engineering building) is 155 feet long and 60 feet wide, with museums, laboratories, workshops, lecture rooms, the largest for 146, drawing room, etc. The fourth story is almost entirely occupied by a large room for drawing, containing 78 tables. The workshops in the neighboring Teachers' College are also utilized by the students of the mechanical section.

These buildings cost between $300,000 and $600,000 each, altogether about $1,750,000. Three of them bear the names of their founders. Eight similar ones are still to be erected; among them, one each for the law faculty, for philosophy and pedagogics, for history and political economy, and for philology. There will also be a college building, costing $312,500. Between these structures, to the east and west of the library, a chapel will be built, for which quite recently an anonymous patron donated $100,000, and a student's clubhouse, which is already in course of construction.[a] Two older buildings, West Hall and College Hall, erected in 1878 and 1882, formerly used for different university and college purposes, than at present, will be torn down as soon as they can be replaced by buildings provided for in the plan. It would, therefore, not be worth while to describe them more minutely.

Finally, the gymnasium under University Hall is especially worth seeing, on account of its fitness and elegance. It has, perhaps, hardly an equal of its kind. Manly sport plays a still greater part in America than in England. The main room, which occupies two-thirds of the building in the rear, is of apse form and measures 35 feet in height, 168 feet in length, and 134 feet in width, with an area of 16,000 square feet, where athletic, gymnastic, and calisthenic exercises may be con-

[a] The chapel and clubhouse were completed in 1903.

ducted. An elliptical running track, constructed with extraordinary care, and which also extends through the front third of the building, is 11 feet broad and 555 feet long.[a] Its ends are slanting with the outer edge 28 inches higher than the inner edge. In a mezzanine story are located rooms for fencing, boxing, and hand ball. There are 32 shower baths with marble walls, as well as 1,600 iron lockers. Half of the room under the gymnasium is occupied by a swimming tank in apse form, 100 feet long, 50 feet broad, and 4 to 10 feet deep, with a capacity for nearly 260,000 gallons. The water is constantly renewed, twice filtered, heated to 68° F., and then cooled. Electric currents radiate through it from the edge beneath the surface. Around the tank are placed four large dressing and rubbing rooms, 42 private dressing rooms of thick opaque glass, and 20 plunge baths, shower baths, and tub baths. In spite of its location below ground everything is brilliantly illuminated by light shafts from large windows. Each student pays $7 a year for exercises, baths, and a locker. On entering, he is subjected to a rigid physical examination, receives advice and instructions according to the state of his health, and is afterwards directed in his exercises. The gymnasium is open from 10 a. m. to 7 p. m. One or more men in authority are always present. Instruction is given very systematically, and it is compulsory for the younger students, in order that everyone may have an opportunity to learn the elements of self-preservation and defense. With this object in view, chiefly boxing, fencing, wrestling, and swimming are practiced. To go further here into the details of the carefully considered methods of exercising would carry me too far. The gymnasium cost about $500,000.

Upon the lower stories described, an additional story is now being built, which is to contain eating rooms, club rooms, and administrative rooms, as well as a hall, capable of accommodating 1,500 persons, for the religious and social life of the students.[b]

Unquestionably Columbia University has a great future before it. It will pursue its victorious career in the foremost ranks of the champions for the dissemination of culture and the advancement of science, and it will the better perform its task if it keeps at its head men of lofty intellectual qualities, of eminent talent for organization, and of far-reaching personal influence. The presidents of the leading universities of the United States hold a prominent place in the public life of the great country; everybody knows them as everybody knows the ruling statesmen and politicians, and they are respectfully heard on questions affecting the public weal. Thus President Low, of Columbia, represented the Government at The Hague Peace Congress of 1899. The presidents exert a much greater influence over everything

[a] See also *Columbia University Quarterly*, I, 1899, p. 295.

[b] This building is now completed.—1903.

concerning the university[a] than the changing rector of the German universities who is subordinate to a government department, and their power of initiative is quite different. That republican Americans love monarchical powers is shown by their railroad kings, their directors of great rings and trusts, and also by the authority of their Presidents, despotic for the time being. Seth Low,[b] doctor of laws, was mayor of Brooklyn and an authority on the subject of municipal administration. In 1889 he was placed at the head of Columbia, and since then a new epoch has been inaugurated in the development of this university.[c] He has not only placed his vast energy and his far-reaching influence at the service of the university, but he also sets an example by his self-sacrificing devotion. He erected the wonderful library of the university, that ornament and model of its kind, by a personal expenditure of $1,250,000, and he ranks in other respects among the most active patrons of the great institution upon which he has left the impress of his mind.[d]

THE PREDOMINANT INFLUENCE OF THE GERMAN OVER THE AMERICAN UNIVERSITIES.

Upon the predominating influence of the German universities over the American, and in consequence over the whole intellectual life of the Union, all voices appear to be unanimous. Thus, among others, David Starr Jordan, president of Leland Stanford Junior

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[a] The difficulties of these positions are excellently described in an anonymous article in the *Atlantic Monthly* (April, 1900, pp. 483–493), on The Perplexities of a College President.

[b] Mr. Low retired in 1901 when he was elected mayor of the city of New York. Columbia then had 385 teachers, 4,500 students, 9 faculties, a library of 311,000 volumes, and its property amounted to $18,000,000, of which Mr. Low had given $1,500,000—1903.

[c] The author of an article "What is a University?" in the *Spectator*, London, February 12, 1898, p. 230, says, among other things: "Columbia is one of the best appointed institutions of learning in the world." A Riedler ("Amerikanische technische Lehranstalten," *Verhandlungen zur Beförderung des Gewerbefleisses*, 1893, p. 422) expressed the opinion seven years ago that Columbia would probably become the foremost institution of learning in the United States. Columbia University and Teachers College were each awarded a gold medal at the Paris Exposition of the year 1900, the former for photographs, publications, and psychology, the latter as a higher normal school.

[d] It might interest German readers to know that Columbia University in 1889 bestowed the degree of doctor of laws upon Carl Schurz. The promoter said, among other things, on that occasion: "We must congratulate ourselves that in honoring him, we help to strengthen the bond which unites Germany and America; that we, in honoring him, also honor the great land which is his parent country and the original home of all those in whose veins flows English blood."

At the same time a Carl Schurz donation to the amount of $20,000 was given to the university by his friends on condition that the interest on one-half the amount should be applied to establishing a fellowship in German and the other half be devoted to purchases for the Germanic section of the library. A knowledge of German is now one of the requirements for admission to Columbia University, and in most of the universities the degree of doctor is bestowed only upon the candidate who is able to read printed German fluently and to translate it into English at sight.

University of California, in an article on "The urgent Need of a National University in Washington,"[a] observes:

The great revival of learning in the United States, which has shown itself in the growth of universities, in the rise of the spirit of investigation, and in the realization of the value of truth, can be traced in a large degree to Germanic influences. These influences have not come to us through German immigration, or through the presence of German scholars among us, but through the experience of American scholars in Germany. If it be true, as Mr. James Bryce says [American Commonwealth, II, 1889, p. 694, 3 ed.], that "of all institutions in America," the universities, "have the best promise for the future;" we have Germany to thank for this. It is, however, no abstract Germany that we may thank, but a concrete fact. It is the existence in Germany of universities, strong, effective, and free.

Even English voices lay stress upon this fact. Thus, in an article in the *Spectator* of February 12, 1898, on "What is a University?" in which, in consideration of the establishment of a university in London, five types of modern universities are characterized, the French, German, English, Scotch, and American (p. 231), it says concerning the American types:

We come now to the American universities, by which we mean the greater institutions of culture, not the hundreds of petty colleges to be found in all parts of America. Some of these, in our judgment, come nearer to the ideal of a true university than any of the other types. Beginning on the old English collegiate system, they have broadened out into vast and splendidly endowed institutions of universal learning, have assimilated some German features, and have combined successfully college routine and discipline with mature and advanced work. Harvard and Princeton were orignally English colleges; now, without entirely abandoning the college system, they are great semi-German seats of learning. Johns Hopkins at Baltimore is purely of the German type with no residence, and only a few plain lecture rooms, library, and museums. Columbia, originally an old English college, is now perhaps the first university in America, magnificently endowed, with stately buildings, and with a school of political and legal science second only to that of Paris. * * * The quadrangles and lawns of Harvard, Yale, and Princeton almost recall Oxford and Cambridge; their lecture rooms, laboratories, and postgraduate studies hint of Germany, where nearly all American teachers of the present generation have been educated.

I myself received the impression that the majority of the professors of the universities which I visited in New York, Chicago, Philadelphia, Boston, and Cambridge, with whom I became acquainted and there were not a few of them—had studied in Germany or had at least spent some time there, of course excepting the few Germans who filled positions in the universities named.

When, in January of this year, the faculty and students of the University of Chicago gave a formal reception in Chicago to the German ambassador, the professor of political economy, Mr. Laughlin, delivered the address of welcome, from which I take the following sentences (Illinois *Staats-Zeitung*, January 25, 1900, p. 5):

There is no American university which is not imbued with the fire of German intellectual activity. We have attended in crowds the lecture halls of the universi-

[a] *Forum*, January, 1897, p. 600.

ties and lighted the lamp of our knowledge at their altars. The Americans have found the love of truth, the sacred yearning after knowledge and poetry in Heidelberg, Göttingen, Tübingen, etc. When we look down upon the red roofs and towers of Göttingen, as upon the red marvel-flower of wisdom as it lies there surrounded by a garland of lindens standing on the old walls, we find there not only the student quarters of Bismarck but also the places where Bancroft and Longfellow intrenched themselves behind their books. To be sure the German universities have not served as models for our own, but we have adapted the spirit of their knowledge to our circumstances. * * * Our debt to German science is great; we can not repay it.

I heard these very words, that the debt of gratitude could never be repaid to Germany, from the mouth of one of the professors of the Technical High School in Boston, when, upon my thanking him for the very obliging reception which I had met with, he refused to accept my thanks.

(In the library of Edison's private laboratory at Orange, near New York, I found, as artistic ornaments, the bust of Alexander von Humboldt and the portraits of Bunsen, Helmholtz, Kirchhoff, Kopp, Liebig, and Magnus, but of no other scientists. When I told Edison how pleased I was to see that he surrounded himself with the portraits of German scientists, he told me of his friendship with Helmholtz and Siemens, and mentioned that he had that very morning to consult a treatise by Wöhler.)

The present ambassador of the United States to the German Empire, A. D. White, at a banquet given in July of this year to the American Mechanical and Civil Engineering Association in Berlin, expressed himself in the following terms: He looked back with great satisfaction to the time, thirty years before, when he had studied the conditions of the high schools and the technical schools in Berlin, he had been able, on his return to America, to point to these institutions as worthy of imitation. As a consequence Cornell University, of which, for a quarter of a century, he was the first president, and other special and technical schools were founded. Many of his countrymen had received in Germany the impulse and the knowledge for the establishment of institutions of learning in their own land. He had returned to America with love and reverence for his teachers. He, with many of his countrymen, regarded Germany as his second fatherland.

L. Triang said, in a lecture on "Germany in the American universities," recently delivered before the German Society of Columbia University (*Zeitgeist*, March 5, 1900):

The student who, after completion of the studies usual in his country, wishes to perfect himself in his profession and carry on special studies, almost invariably goes to Germany, where a great proportion of the entire body of American teachers have received their final education and imbibed the German spirit of learning and the German scientific faithfulness.

Prof. Harry Thurston Peck, of Columbia University, and, as editor of the *Bookman*, one of our most prominent critics [I quote from an article by M. Groszmann in *The Open Court* (Chicago), October, 1899, p. 620], showed in a recent article that the old traditions of American education have been wiped out by German influence;

that a vivid interest in German pedagogy is asserting itself more and more, and that German language and literature are crowding out other foreign influences. He went so far as to say, "German influence has already altered the racial character of our people."

In Volume II of the report of the Commissioner of Education for the year 1897–98 (Washington, 1899), in the chapter entitled Foreigners in Universities of Europe," page 1702, and in other places of this great work, may be found the following statements: American students preferably attend Jena, Leipzig, Heidelberg, and Berlin, owing to the courses at these universities. In 1895, 3,362 foreigners were matriculated at German universities, of whom 514 were Americans, but it is estimated that at least an equal number studied by attending lectures, so that altogether an annual quota of over 1,000 Americans may be estimated. At the same time only 108 Americans were matriculated in Austrian institutions and 65 in Swiss institutions. In 1895 Berlin had 159 Americans out of 4,018 students, Leipzig 53 out of 2,798, Göttingen 30 out of 878; Paris, on the other hand, had only 32 out of 10,915.[a]

James Bryce (American Commonwealth, 3d ed., II, 1899, p. 682) says, giving reasons therefore, that "extremely few" of the American students go to Oxford or Cambridge in England. With reference to France, it is stated in an article by F. C. Newcombe, "Opportunities for biological study in Paris and the requirements for the new doctorate," in *Science* (May 11, 1900, p. 740):

> Why do these men in American universities advise their students to go to Germany? Why are the scientific libraries in this country so much better stocked with German literature than with French literature? I can not help feeling, though I have no statistics, that on the whole Germany has, within the past forty years, produced more scientific men and more scientific literature than has France. It is doubtless true that we neglect unduly French scientific literature in this country, but it is probably also true that to-day, as forty years ago, we justly look to Germany as the seat of the leading spirits in the progress of biological science.

E. D. Perry, professor of Greek in Columbia University, says:[b]

"It is the glory of Germany that she has seen more clearly than other nations how true it is that the highest scientific training is none too good for her public servants." Compare his very plain statement concerning the influence of the German university on the development of American universities, pages 288 and 289. Although S. Sherwood (University of the State of New York, Regents' Bulletin No. 11, Albany, 1893, p. 269) ascribes to the "revolutionary France" the greater influence in shaping the character of the entire modern system of education of Europe and America, nevertheless he freely admits that the German systems are now "models for the world."

In a very interesting manner H. A. Hinsdale, professor of peda-

[a] The bad influence of Paris on the students has been described in *Nation*, p. 149 August 23, 1900.

[b] Education in the United States, edited by N. M. Butler, I, 1900, p. 306.

gogies in the University of Michigan, also describes this same influence in the chapter Notes on the History of foreign Influence upon Education in the United States of the above-cited education report (I, p. 603–629). Among other things he there gives a list of the Americans who studied in Göttingen from 1789 to 1851, in Halle from 1826 to 1849, in Berlin from 1825 to 1850, and in Leipsic from 1827 to 1840. Supplementary to this, Professor Perry, who has already been quoted, remarks[a] that after 1848 a noticeable number of Americans, including many of the most eminent scholars the country has produced, obtained degrees in Germany, and that after 1870, hundreds visited Germany annually, which, together with the opening of the Johns Hopkins University in Baltimore in January, 1876, on an avowedly German plan, gave a mighty impulse.

In the same periodical (p. 6) H. A. Todd, professor of romantic philology in Columbia University, states that prior to the last twenty years American students abroad attended almost exclusively German universities. To-day, therefore, the American universities are manned preeminently by professors who have been in close contact with the leading minds of Germany. Although it is now customary to advise American students to study for a year in Germany, Professor Todd can, "with prophetic eye, foresee the time when it will become of interest to an increasing number of European students to seek part of their training in the United States." I think time will show that he is right. That so large a percentage of the active professors of the American universities have studied in Germany may perhaps be in part explained by the fact that the men who sought to complete their education in Europe were a very select intellectual band. Only the best fitted and the most ambitious young scientists felt the desire to extend their circle of vision. Their knowledge and their views were essentially widened in Europe, and thus they returned predestined to fill positions as teachers.

Prof. H. Münsterberg, of Harvard, has recently expressed the opinion[b] that, although the spirit of American universities has for the past fifty years been determined by men who have studied in Germany and brought home with them enthusiasm for German science, these relations are now changing. The number of students, he says, who after a couple of years of study return from Germany deeply disappointed, is increasing in a striking manner, and everywhere the advice is heard to finish one's ordinary studies in America and to seek further inspiration in Germany only after having obtained a degree. Such a change would show that the former conditions of dependence no longer exist to their former extent, and that the time when Professor Todd's prophecy will come true is already approaching.

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[a] *Columbia University Quarterly*, II, 1899, p. 3. [b] *Zukunft*, 1900, No. 35, p. 392.

6. IRON FURNITURE, GLASS CASES, FIREPROOF BUILDINGS, LIGHTING OF INTERIOR OF BUILDINGS, DISTANT HEATING.

IRON FURNITURE.

The Art Metal Construction Company of Jamestown, New York, formerly the Fenton Metallic Manufacturing Company, which has its office (and samples) in the magnificent building of the New York

FIG. 21.—Fire-proof policy room of the New York Life Insurance Company.

Life Insurance Company, 346 Broadway, manufactures, among other things, iron cases for documents and records of every description, library stacks and furniture, such as desks, tables, chairs, cases, etc. In the building mentioned it has fitted up several of its offices entirely

fireproof with iron furnishings to the value of $50,000. I give two illustrations of the policy room and its ground plan, as well as an illustration of its iron correspondence case with iron, double-roller shutters. This firm also manufactured the previously mentioned handsome book

FIG. 22.—Another portion of the room shown in fig. 21.

stacks of Columbia University. Its contrivances are widely distributed over the entire great country. Among other things worth seeing in New York is also the fireproof real estate record room of the New York Central and Hudson River Railroad Company, installed by this

firm, where everything is of iron. It has done some very excellent work in several Government buildings in Massachusetts, about which I shall speak under Boston. The authorities of the United States, for

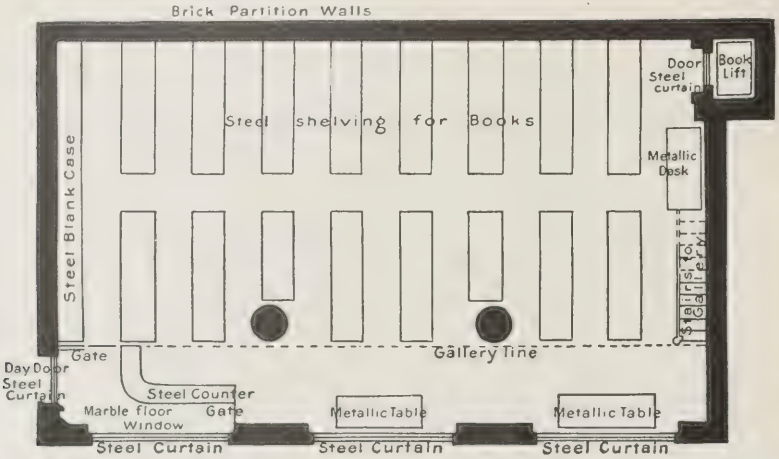

FIG. 23.—Ground plan of the room shown in figs. 21, 22.

the sake of greater security against fire, are turning more and more to iron furniture, which is preferable to wood also on account of its general appearance. Iron is prepared for this purpose with much better machinery than among us, and is, in consequence, in spite of higher wages, much cheaper than in Germany. It has at the same time the advantage of an elegant exterior. Especially perfect is the varnish, which is obtained by triple burning. By its use the iron becomes as if enameled. It is, moreover, adorned with bronze, brass, marble, painting, and the like.

FIG. 24.—Document case, with double-roller curtain. (See p. 381.)

There are several larger firms of the same sort in the United States, as, for example, Snead & Co. Iron Works in Louisville, Kentucky, which, among other things, constructed the remarkable iron book stacks in the Library of Congress, to which I shall refer in a later report; there is also J. B. and J. M. Cornell, Twenty-sixth street and Eleventh avenue in New York (also Cold Spring in New York), who manufactured the furnishings of the county court-house in Worces-

ter, Massachusetts, and at whose establishment I saw document cases and record cases in course of construction for the court-house in Baltimore, parts of an order for $60,000. The iron book stacks of this firm pleased me particularly on account of their simplicity, as compared with the different models which I saw in the libraries of New York, Albany, Buffalo, Chicago, Washington, Philadelphia, Boston, and Cambridge. The figured case for folio volumes which rest upon rollers can be closed by iron roller shutters.

With regard to fireproof rooms and their fitting up with iron furniture, we in Europe are, at all events, far behind America, and I can not too strongly recommend adopting in our museums and other public buildings such contrivances which are already in very general use

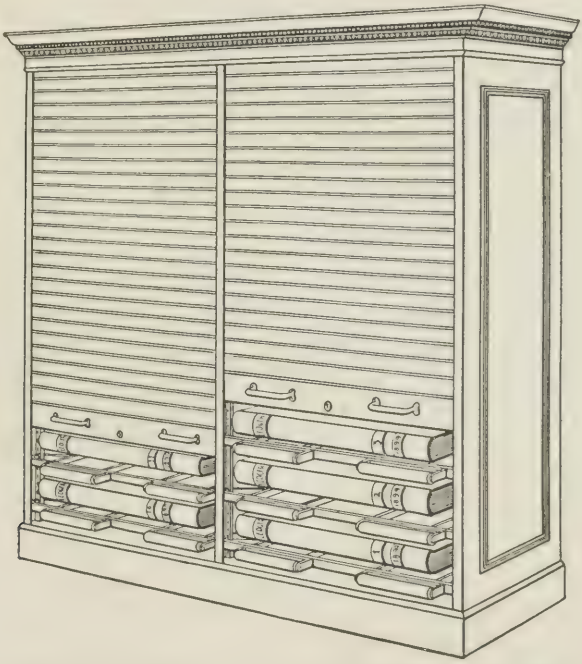

FIG. 25.—Case for folio volumes, with roller curtain and books on rollers (See p. 382).

there. One of the above-mentioned firms has the motto, "Anything in metal from a building to a box." It is the more surprising that the American museums have as yet no iron, but only wooden cases and desks for their collections,[a] whereas the former are already used to some extent in Europe. There can be no doubt that the Americans, when once they shall have decided on iron furniture for museums, will be in a position to construct it in a much more perfect manner than we have as yet succeeded in doing in Europe, since their experiences with other iron contrivances have already carried them very far.

[a] They have since begun to fit with such the Wistar Institute in Philadelphia, and, I believe, other places.

It is difficult to induce the firms mentioned to execute small orders for Europe. I have so far only succeeded in obtaining for the Dresden Museum from Snead & Co. a free standing iron book stack, and from the Art Metal Company an iron card catalogue case with twelve drawers.

GLASS CASES.

At the establishment of F. Pollard (33–37 Bethune street, New York City; also Cleveland, Ohio, and Pittsburg, Pennsylvania) I saw glass cases and glass desks without framework except on the back, and of excellent workmanship. My attention was first attracted to very large show windows of this kind whose plate glass panes were not fastened in iron or wooden frames, but were held by metal screws which pressed the edges of the glass together, with only a thin layer of cloth

FIG. 26.—Long, low case, or desk top, with marble base. Opening behind.

between to make them fit tightly. These cases are, so far as I am aware, as yet nowhere used in museums. They now serve only for show cases in business houses, but are excellently adapted for public collections on account of their elegance and absence of framework on the show sides. Cases completely proof against dust, which have not as yet been manufactured, could easily be attained. They are opened and closed at the back by means of glass doors in wooden or white metal frames; socle or base of marble or of any other material. I give a figure of a case of the kind which, with lower socle, could be used as a desk top, and which may be had up to five meters in length. I obtained a sample of such a case of smaller size for the Dresden Museum. At the Industrial Exposition in Philadelphia I saw similar very elegant glass cases manufactured by the firm of F. X. Ganter, Leadenhall and Stockholm streets, Baltimore, with branch houses in Boston, New York, Philadelphia, and Washington. These cases were made tight by means of silk bands. The business is now turned into a joint stock company, the Crystal Show Case and Mirror Company, which is to go over "the whole earth."

NEW YORK CLEARING HOUSE, NEW YORK CITY.

UNIVERSITY CLUB HOUSE, NEW YORK CITY.

FIREPROOF BUILDINGS.

In New York very many fireproof and burglar-proof buildings may be found. I inspected among others the magnificent building erected by Gibson in 1896 for the New York Clearing House Association (Cedar street), whose balances amount annually to $35,000,000,000[a] and where millions in gold are constantly stored. Everything is done here to guard against robbery, fire, and insurrection. The different rooms are separated from one another by grates and doors; the iron cases for valuables are so constructed that they may be instantly closed by a grasp of the hand; the cash vaults may be submerged, and the whole may be turned into a kind of fortress with cannon and muskets. Electric bells to summon aid from without are to be found everywhere. The vaults could be reached by dynamite only in case one were willing to bury himself under the ruins, since undermining it from without is practically impossible on account of the deep foundation. Elsewhere iron armor plates have been employed as a protection against cannon balls. It does not appear from without that the clearing house is so formidably protected. Such contrivances would, indeed, not be applicable to museums, but some of them might be introduced to protect certain objects of value or sections of the museums.[b]

I take at random among others, as an object well worth seeing, the recently completed fireproof building of the University Club (Fifth avenue and Fifty-fourth street), five stories in front and eight stories in the rear, constructed by McKim, Mead & White. It is a Florentine fortress-palace, 125 feet in height, ornamented among other things with the arms of eighteen American universities in stone. The club has 3,000 members, all of whom must possess a learned degree in order to be admitted, and contains a library of 20,000 volumes. A higher standard of solidity, fitness, and carefully planned, practical utilization and distribution of space, with taste and elegance in execution, could scarcely be imagined. The flat roof, which affords a fine view, serves in summer evenings as a pleasant resort. In the cellar there is a gymnasium. All mechanical contrivances are of a high degree of perfection, embodying all possible modern inventions, and many of them would be applicable to buildings for collections. The whole is a model and unique structure of its kind and comparable only to a prince's palace. The cost of the ground, building, and furnishings amounted to over $2,125,000.

[a] The average daily balances in 1901 were $254,193,638; on May 10, $598,537,409, The average daily balance in gold and bank notes was $11,600,784.

[b] In the basement of the Swiss Landes Museum at Zürich there is a fireproof and burglar-proof room, lighted only by electricity and handsomely installed, for all the precious things of the collection and where they are exhibited to the public in iron desks.

With regard to the fireproofing the following may be specially noted: The outer walls are of brick and granite; all the inner partitions of hollow terra-cotta blocks. The ceilings are supported by wrought-iron columns, which are covered over with hollow terra-cotta blocks. The joists are of steel, and the dome ceiling is constructed in even arches of hollow terra-cotta blocks. The space between these blocks and the joists is filled with concrete. In this concrete are placed the beams, to which the flooring is nailed. This and similar ceiling construction is indeed known and used among us, but is not in such general use as in America.

For protection against fire, two 4-inch pipes run from the roof to the cellar, where they are connected with a steam pump, and continue out to the street, so that the hose belonging to the city fire department may be attached to them. In each story there is a branch pipe with hose coupling, hose, and mouthpiece. The hose is wound around a wheel. The roof is flat and completely covered with glazed bricks.

In the roofing of fireproof buildings special attention should be paid to protection against flying cinders, which may extend much farther than is generally supposed. Some years ago a fire broke out in a private residence on Fifth avenue between Sixty-seventh and Sixty-

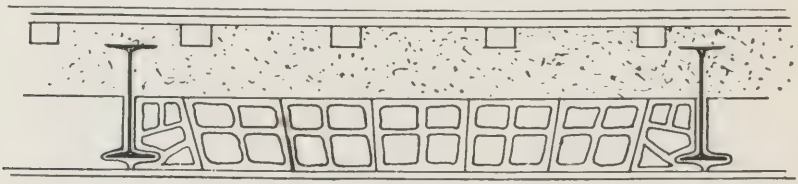

FIG. 27.—Ceiling and floor construction.

eighth streets, opposite Central Park, in the best part of the city, by which thirteen persons lost their lives. The sparks flew over two cross streets and ignited the roof of another private residence, resulting in the loss of two additional lives, and yet the houses in this locality all look like solid stone structures. The distance was from 600 to 650 feet. This shows the danger of leaving buildings containing collections in the middle of the city, as some of them are located in Dresden, without very carefully planned protection against fire, especially in the upper portions. Fire has often been known to cross a street more than 65 feet wide.

In describing the institutions of Chicago I shall return to the subject of fireproof buildings and questions connected with them.

The heating and ventilating apparatus in the model building of the University Club may also be described somewhat more in detail:

The exhaust steam of the electric light and power plant suffices for heating the entire building with low-pressure steam. Every radiator has its own supply pipes and return pipes, and the main return pipes run into the cellar below the water level of the boiler, in order to afford

safer and noiseless circulation. The condensed steam is forced back to the boilers by self-regulating steam pumps.

The temperature in the main rooms is automatically regulated by Johnson thermostats. This apparatus was invented by Professor Johnson, of Milwaukee, and perfected to its present successful application. The Johnson Temperature Regulating Company, Fourth avenue, New York, has already set up such apparatus in hundreds of buildings. The most essential portions of the apparatus consist of diaphragms and cut-off valves to control the source of heat, moved by compressed air, and thermostats, which regulate the flow of compressed air to the valves by the movement of a compound band. This band is to be adjusted so that the desired range in the temperature may thereby be attained. The ventilating system is independent of the heating, so that it may be set in motion according to the need of the different times of day. The fresh air is warmed a little so that it does not disturb the equilibrium of temperature in the rooms. This warming is also regulated by thermostats. The system of ventilation insures a thorough circulation, but at the same time prevents a draft. All the main rooms are sufficiently provided with fresh air, which is changed on an average six times an hour. The exhaust air is drawn off according to the need. The cloak rooms, toilet rooms, etc., the kitchen, which is fitted up in a specially ingenious manner, and the laundry have exhausters only. The air is here renewed from ten to fifteen times an hour.

The fans which supply the air are centrifugal blowers, which are driven by direct-acting, high-pressure engines. These fans, the engines, and the heaters occupy a special room in the cellar. The exhausters on the roof are discoidal ventilators, which are driven by direct-acting electromotors.

LIGHTING OF INTERIORS.

I saw for the first time in the Boston Art Museum a lighting of rooms by windows with prismatically-ribbed panes, which made it possible to illuminate otherwise somewhat dark wall surfaces in such a manner by daylight that they were thereby adapted to the hanging of pictures. When once my attention was attracted to this matter I found such prismatic panes in use in many other places. I hunted up the business office of the American Luxfer Prism Company, 160 Fifth avenue, New York, a company which originally had its headquarters in Chicago, but which now has its central office in London under the name General Luxfer Prism Company, with branches in Chicago, Toronto, London, Paris, and Berlin. In the United States the American Luxfer Prism Company has its offices in seventeen other cities—an extensive industry whose products are widely distributed.

It is the more astonishing that museums have not yet directed their attention to this matter, for nowhere did I find this glass in use except

in the Boston museum mentioned, unless it escaped my notice, while scarcely a building for collections exists which is not capable of improvement in this respect. The company makes 60 different kinds of prismatic panes and single prisms, the latter for skylights, which in the United States are used very much in rooms under the pavements of the streets, since these rooms belong to the cellars of the adjacent houses. The ribbed panes, of the uniform size of 10 square centimeters, are electrolytically glazed between flat copper bands,[a] and are then fireproof, which offers another great advantage and permits their employment as window shutters, doors, etc., for closing entire stories, and the like.

A similar company is the Mississippi Glass Company, with agencies in Boston (Boston Plate and Window Glass Company). Prof. C. H. Norton, of the Massachusetts Institute of Technology, made a report on this subject in 1898, based upon experiments (The Diffusion of

FIG. 28.—Prismatic, ribbed-glass unit of the American Luxfer Prism Company.

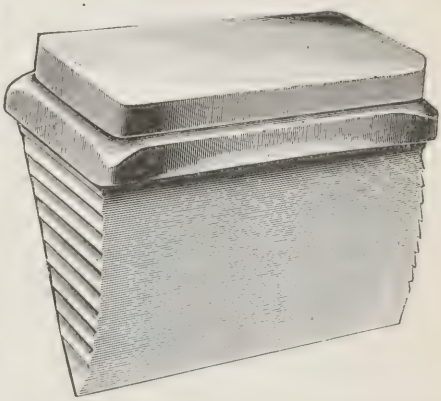

FIG. 29.—Single prism, as made by the American Luxfer Prism Company.

Light through Windows, in the seventy-second circular of the Boston Manufacturers' Mutual Fire Insurance Company, by E. Atkinson, 13 pages in quarto).[b] O. H. Basquin published in 1899 for the German Luxfer Prism Syndicate in Berlin a Handbook on Luxfer Prisms and Electro-glass (82 pages, quarto, with 21 plates and about 100 text figures), which offers an explanation of this subject, which is so important for lighting and such a security against fire.[c] I give a

[a] There are now (1903) manufactured large panes of prismatically ribbed glass without these copper bands between, which, though not as powerful as those small ones, give very good results (as I experienced in the Dresden Museum), and which are much cheaper.

[b] This appeared in 1902 in third enlarged edition, in Report III of the Insurance Engineer Experiment Station, 31 Milk street, Boston, pages 10–33, with many illustrations, quarto.

[c] Dr. B. Wandolleck, assistant in the Dresden Zoological Museum, was kind enough to prepare the following statement concerning luxfer prisms and electro-glass, based on the two papers cited in the text as well as on his own studies. I insert it here

figure of a prismatic ribbed glass plate and a single prism. The latter may be had up to a considerable size. The flat form (multi-prism plate) costs $30 to $40 a square yard; and the ribbed glass plates in their copper frames, $20 a square yard. I have made a trial of a window with about 5 square yards of plate glass in the ethnographic department of the Dresden Museum.

because I consider the subject important for museums so long as they have not learned to build them with all rooms equally well lighted:

Everybody has perhaps noticed that rooms on the ground floor, under most circumstances poorly lighted, in winter, when the window panes are thickly covered with frost, have an agreeable, uniform light. They have perhaps also noticed that at other times, when the panes are clear and dry, only a small space near the window is really well lighted and the other parts of the room remain more or less in shadow. In the case of the frost a peculiar diffusion of the light is noticeable, the sharp contrast between the part near the window and the inner part has disappeared, and only very gradually does the intensity of the light diminish toward the back part of the room.

For lighting a room by daylight by means of its windows, the bit of open sky which looks in through the windows is more important than anything else. The

Fig. 30.

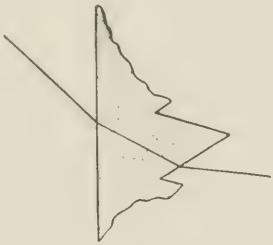

Fig. 31.

amount of light derived by reflection from other objects is, on the other hand, very small. The nearer opposite buildings are to the windows of a room or the higher those buildings are, the smaller will be the bit of sky which can look into the room and light it up. Why, then, under the same conditions of light, does such a room appear brighter—that is, more uniformly lighted—when the windows are frosty than when they are clear?

The window is struck by a bunch of rays which goes through the plane parallel glass without changing their direction (fig. 30), and the more obliquely they fall the smaller will be the surface of floor which they strike and illuminate. The light which illuminates the rest of the room is derived by reflection from this small spot.

The particles of frost on the windows consist of crystallized water, of an immense number of small hexagonal prisms. Every ray of light which strikes one of these small prisms is refracted and takes another direction. Since the numberless prisms lie in every conceivable direction on the surface of the glass, the rays of light striking them are also turned in every possible direction. They will not fall parallel on the floor as before, but shoot into the room in every direction. The room is no longer filled with the scanty reflected light which comes from the lighted spot on the floor, but with light direct from the sky (fig. 31).

This observation has led to a discovery which is of the greatest importance in lighting dark rooms by daylight. The problem to solve was merely to replace the

DISTANT HEATING.

The distances which in Dresden are taken into consideration in the establishment of the distant-heating plant for the museums, etc., hold a middle place between American district-heating systems and distant-heating establishments, but incline more toward the former.

The New York Steam Company has established a great district steam heating system with several boiler houses in the lower part of the city almost from the Battery to the other side of the city hall, 1,500 yards up Broadway, extending about half that distance east and west in the side streets; altogether about 8 miles of pipe. Among other great buildings included in this system are the post-office, Mills Building with ten stories, and Manhattan Life Building with its 350-foot tower. The amount of steam furnished (including power) is said to be satisfactory, but the returns are not considerable. Such district heating establishments are to be found in Lockport, Detroit, Philadelphia, Washington, Hartford, etc., but all except one are out of use, as they did not prove a success. On the other hand, district heating systems have lately been combined with electric plants by utilizing the exhaust steam, as in Springfield, Illinois, and in other cities. For the financial success close proximity of the heated district

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ice prisms of the frozen windows by glass prisms and to give the glass prisms a regular arrangement in place of the irregularity of the ice crystals. Another part of the problem to solve was to regulate the direction of the rays falling in at random. Everything was already fully accomplished by the Fresnel lenses in the light-houses. It was therefore only necessary to remodel this costly contrivance so as to adapt it to other uses and to cheapen it enough to bring it within reach of the general public. This the Luxfer Prism Company succeeded in doing. It manufactures out of plain, colorless, hard-glass mold small, strong window panes, with one surface plain, but the other fluted with deep parallel grooves. By means of these furrows they obtain strong strips of glass, to which are given the form of distinct-angled, three-sided prisms. The prisms have a common basal surface, parallel to the plane surface of the plane, and their corresponding surfaces are likewise parallel. (See fig. 28.)

If rays of light fall upon the plane, they are not conveyed on in the same direction, as in the case of ordinary window glass, but are refracted to an angle bearing a definite relation to the angle of the prisms. (Fig. 31.)

If we take a window consisting of nothing but prism panes, all of whose prisms lie parallel, all rays of light will strike into the room in a parallel direction. It is easy to understand that by a different arrangement of the prism panes or certain portions of them, rays can be conducted into any desired parts of the room.

But all poorly lighted rooms do not have such spacious windows as supposed in the above description. A very large number of rooms lie below the level of the street. Their small windows and the poor light of the generally large rooms limit their use to a great extent. These windows, which are placed in a narrow shaft and often scarcely rise above the level of the street, excludes the use of those prism panes because the amount of light coming in from the sky is entirely too narrow. This difficulty has been obviated by the construction of a particular kind of prism.

The mass of light would become greater if the light shaft could be made larger, but traffic on the street forbids that.

It therefore became necessary to find some contrivance which would make it possible to enlarge the light shaft without interfering with the street traffic. The light shaft is covered by a plate consisting of prisms. This plate is composed of very

to the power station and also a certain size of the district is requisite. In St. Joseph, Missouri, a block of business houses, with a room space of over 300,000 cubic yards, is heated by the exhaust steam from the electric station situated a mile away.

On the other hand, it has been discovered that the special heating apparatus is more advantageous for very large buildings and single groups of buildings, although the expenditure of coal is not thereby diminished. Of such, there are very many in America. Most large buildings have their own power plants for electric lighting, electric and hydraulic power for elevators, ventilators, etc., and for the manufacture of ice and the like, in which the working engines afford steam for heating almost without cost. Chimneys project but little above the roofs and never give forth such smoke as among us, especially as in Dresden. In America better coal is burned. Relatively few high chimneys are seen in the cities and they do not attract so much attention on account of the height of the buildings. I have already mentioned the distance-heating of Columbia University. The Grand Hotel on Broadway possesses a plant for electric lighting for four blocks of houses,[a] and the exhaust steam from the engines suffices to

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large single prisms (see fig. 29, p. 388), which receive light direct from the sky on their entire basal surface. They then throw this maximum mass at a fixed angle against the perpendicular or oblique, stationary or movable windows of the room, whence prism panes, instead of the usual window glass, distribute the rays.

In order that the ideas which we have just traced, and which rest upon physical principles, might be put into practice with a result approaching as near as possible to the theory, one more invention was requisite, namely, that of galvanic glazing.

Whereas formerly, and still almost universally, the panes are fastened to the framework of windows by means of putty or strips of lead, galvanic glazing employs electrolytically precipitated, and therefore to a certain extent plastic, copper as a cement. The single panes, with a framework of thin copper strips, are tied to plates of fixed size, and thus placed in the copper bath. In about thirty hours electrolytic copper is precipitated upon the copper strips and this binds the panes to their frames firmly and immovably, making them absolutely air proof.

The advantage of this electrolytic glazing is great. In the first place, the strips separating the panes can be made considerably narrower, which is equivalent to a smaller loss of light; and then such windows are more elastic and much more capable of resistance than puttied windows, and show themselves to be fireproof to an eminent degree.

While windows glazed in the usual manner immediately burst and fall out on being heated, these windows have shown their absolute stability during very many trials. If, while heated, they are struck by a stream of water from the hose, they burst, to be sure, but never fall out. Electro-glazing is therefore to be used especially in elevator and light shafts, since the latter, with their glazing so little capable of resistance, are not only incapable of opposing the devouring element in the different stories, but generally open the way to it.

[a] In New York among most of the straight long and cross streets a block east of Fifth avenue is in general from 400 to 420 feet long and 200 feet wide, the long streets from 75 to 140 feet wide, and the cross streets 60 feet wide; west of Fifth avenue a block is generally 800 feet long and 200 to 204 feet wide, the long streets being 100 feet wide and the cross streets 60 or 100 feet wide. If you ask the distance of anyone on the street he will usually reply that it is so many blocks.

heat the hotel. Most of the great hotels in the United States have their own power plants.

In installing the plant it is of the greatest importance to protect the hot pipes from the outside water. This may be accomplished by proper drainage.

It is also important, by the insertion of expansive joints of special construction and fixed in a particular way at proper distances, to compensate for the expansion of the pipes and to keep them in position. In this case it is always advantageous to place the boilers deeper than the building to be heated. Finally, the pipes should be isolated. This is best accomplished by laying them in cemented conduits easily inspected, and by wrapping them in asbestos paper, hair felt, and linen, to prevent loss of heat so far as possible. The pipes then remain serviceable from five to fifteen years, according to the temperature to which they are subjected; furthermore, those protected by a covering of incombustible mineral wool last still longer. This question has been made the subject of an extended series of experiments. Hot water has the worst effect on iron, whereas steam is harmless.[a]

What I have said is certainly far from exhausting the subject of what New York has to show with reference to buildings for collections and technical scientific contrivances, in their bearing upon museum interests. Lack of time, however, has compelled me to limit my observations, nor can I in making my report discuss everything that I have seen.

II.—ALBANY.

[On the Hudson River, the capital of the State of New York, with over 100,000 inhabitants.]

7. UNIVERSITY OF THE STATE OF NEW YORK.

This university was founded in the year 1784 by the State of New York, by which it is maintained and governed. It is, however, not a didactic university, but a kind of supervising administrative department of instruction, unique of its kind, and traceable to the influence of the French philosophers of the eighteenth century.[b] The institution,

[a] I obtained the greater part of these remarks concerning heating from the report of Water Inspector Hoech, 1898, at the Imperial embassy in Washington, which was kindly placed at my disposal by the royal Prussian ministry of public works, and which is also referred to in the *Centralblatt für Bauverwaltung*, XIX, pp. 69 to 70. I consulted, besides, the work of R. C. Carpenter, Heating and Ventilating Buildings (New York, Wiley, 3d. revised ed., 1898, xiii, and 411 pp.), particularly pp. 260–267, Transmission of Steam Long Distances, and pp. 197–200, Protection of main Pipe from Loss of Heat. Mr. Carpenter is professor of experimental engineering in Cornell University, Ithaca, New York.

[b] See S. Sherwood: University of the State of New York: Origin, history, and present organization, in *Regents' Bulletin* No. 11, January, 1893 (Albany), pp. 201–300, as well as Bulletin No. 38, June, 1897, Laws, Ordinances, and By-laws, pp. 401–504. The secretary's report in *Regents' Bulletin* No. 25, May, 1894, pp. 324, also gives much interesting information concerning the organization, administration, etc. Further, Handbook No. 1, Outline, pp. 42 (1893).

STATE CAPITOL AT ALBANY.

East front

perhaps, most resembles the "Université de France," founded by Napoleon in 1808. It is trying to solve the universal problem of extending culture, and has supervision in the State of New York over 34 universities and academic high schools (colleges of liberal arts), 76 professional technical schools, 139 academies, and 559 high schools (that is, secondary schools) with 101,630 scholars, over 183 libraries, museums, and the like, as well as over 523 organizations which are affiliated with it—that is, over 1,514 in all. "Its activity embraces not only the field of work of academies, colleges, universities, professional and technical schools, but also that of libraries, museums, courses of lectures, and the like." It is governed by nineteen unpaid regents (who are elected in the same manner as Senators of the United States, and who are the only life-tenure officers in the State of New York), together with the governor, the lieutenant-governor, the secretary of State, and the superintendent of public instruction, with a chancellor and vice chancellor at the head, who are likewise elected and serve without pay.

The university confers degrees after examinations, as well as licenses to practice medicine, dentistry, and veterinary medicine in the State of New York. It annually aids the institutions named to the extent of $250,000, provided each of these institutions raises a similar sum for the same purpose, and it aids public libraries to the extent of $50,000, on the same condition. Its annual budget amounts to $500,000 (1899). Like other States of the Union, the State of New York has a department of public instruction which directs the elementary schools (free common schools), and nine-tenths of all the children attend these schools; but no other State of the Union has a department which attends solely to the interests of higher instruction. As such this department exercises jurisdiction over the institutions which are placed under its control. It holds annually a congress for higher instruction, which is attended by delegates from other States and universities, and whose proceedings are published.[a] It was lately proposed to establish in the State of New York a department of education, which was to embrace the university and the department of public instruction, with the chancellor of the university as responsible, executive, and administrative head, but the project has so far not been carried out.

The university is organized into six departments: Administration, colleges, high school, home education, library, and museum. It has its offices in the capitol. The administrative department includes the executive, the general supervision, the finances, and the duty of making reports.[b] The college department conducts the examinations

[a] For example, Thirty-seventh University Convocation of the State of New York, June 27–29, 1899, in *Regents' Bulletin* No. 48, October, 1899, pp. 209–431.

[b] See Annual Regents' Reports beginning with 1787, Proceedings of the convocation beginning with 1890, in 47 numbers.

and confers degrees. There are 68 different examinations and 120 branches. They are held in the above-mentioned 760 institutions of learning themselves, as well as at different central localities, where ten or more candidates appear.[a] The high school department organizes instruction and lectures in wider circles.[b] The home education department has six subdivisions: Extension teaching,[c] study clubs,[d] exchanges, traveling libraries, public libraries,[e] and library school. The State library department manages the library; the State museum, the museums.

In the following pages I shall confine myself to the last two institutions, and shall, moreover, consider only the traveling libraries, the exchange system, and the library school, since these are connected with the library.[f] All three belong to the Home Education Department.

NEW YORK STATE MUSEUM.

The State Museum is a museum of natural history, whose beginnings reach back to 1836, when the geological survey of the State of New

[a] The examiners are appointed and paid, which requires over $25,000. Examinations are held in law, medicine, dentistry, veterinary science, accounting, commerce, library science, languages, literature, mathematics, astronomy, physics, chemistry, geography, descriptive natural sciences, physiology, hygiene, history, political economy, stenography, and other subjects. See Annual examination reports from 1894–1897, and Examination bulletins, in 16 numbers: For example, 4, Law syllabus, 116 pages, 1895; 7, Medical syllabus, 126 pages, 1895. Annual college reports, beginning with 1898; College department bulletins: For example, 4, Professional examination papers, 188 pages, 1899; 13, Business syllabus, 59 pages, 1900.

[b] See Annual High School Department Reports beginning with 1898, High School Department Bulletins in 18 numbers, for example: 4, Academic Examination Papers, 303 pages, 1899; 6, Associated Academic Principals' Proceedings of the Fifteenth Annual Conference, 184 pages, 1900; 8, Academic Syllabus, 224 pages, 1900.

[c] See Annual Extension Reports beginning with 1894, Extension Department Bulletins in 30 numbers, for example: 28, Report of Extension Teaching Division, 26 pages, 1898; 30, Report of Summer School Division, 44 pages, 1899; further, Extension Circulars, 34 numbers, and Extension Syllabuses, 80 numbers.

[d] See Extension Bulletin 23, Study Clubs, Annual Report, 90 pages, 1898.

[e] This subdivision (Public Libraries Division) is charged with the duty of stirring up local libraries and advancing their interests in every manner. It does this by counsel, by making up lists of the best books with remarks, by cash appropriations up to $200 a year each, the latter not only to public, but also to all other free libraries, as well as to any 25 taxpayers who ask for it together in places where no libraries exist. An equal amount must be raised by the institutions or persons concerned. The budget of this subdivision amounts to $50,000. See also Extension Bulletin 27, July, 1899; Public Libraries 8; Public Libraries Annual Report, 1898, Albany, 1899, 70 pages (this report, drawn up by Dewey, is a model of its kind).

[f] Considerable general information may be derived from a series of small handbooks, some of them illustrated, such as (1) Outline, (2) University Law, (3) High School Department Examinations, (4) Home Education Department, (5) New York State Museum, (6) List of Publications, (7) Library School, (8) Public Libraries Division, (9) Organizations and Institutions, (10) Study Clubs, (11) Library Handwriting, (13) Paleontology, (14) Library School Summer Course, (15) Guide to Excursions in the Fossiliferous Rocks of New York State, (50) Views in the New York State Library, (54) University of the State of New York.

York was established. This survey at that time embraced entomology and botany within its scope. In 1857, jointly with the New York State Agricultural Society, a building was erected for the growing collections and called the Geological and Agricultural Hall. In 1870 it received the name State Museum of Natural History. It is now called the New York State Museum. In the course of years the space became inadequate, so that a portion of the great paleontological collection had to be placed in the old State House, the entomological, botanical, and ethnological collection in the capitol; but a great new building is planned for the State library, which will also accommodate the museum collections until a special building shall become necessary for them also. There is a prospect that the plan will soon be carried out, since present conditions are untenable.

The annual budget amounts to $40,000. The director is State geologist. There is also a State paleontologist, a State entomologist, and a State botanist. Each of these has one assistant, and there are also six other employees. In summer, however, a large number of persons, mostly young scientists, are appointed in the geological survey. The collections are open daily except Sunday from 9 a. m. to 5 p. m.

The State museum and the geological and natural history survey have published since 1842: Natural History of New York, 30 quarto volumes on zoology, botany, mineralogy, geology, agriculture, paleontology (mainly), with many plates and maps; annual museum reports since 1889; geologist's annual reports since 1881; botanist's annual reports since 1869; entomologist's annual reports since 1882; seven volumes of museum bulletins, in 34 numbers, since 1887; three volumes of museum memoirs since 1889; an economical and geological map of the State in two editions, and some handbooks, such as: 5, New York State Museum (28 pages); 13, Paleontology (8 pages); 15, Guide to Excursions (120 pages); 16, Entomology (12 pages); 17, Geology. All these valuable publications relate only to things found in the State of New York, and are to-day even more zealously continued. Since 1836 more than $1,500,000 has been expended on the geological survey.

The museum is a provincial museum in the best sense of the word, which in its way reminds one of the Stuttgart Provincial Museum. Its most renowned constituent part is the great geological and paleontological collection of James Hall, for many years State geologist, who had already in the eighties sold a portion of his private possessions, the collection of type specimens, to the American Museum of Natural History in New York for the sum of $68,725, and whose property left at his death, especially rich in fossil invertebrates, will perhaps be purchased for the State museum for $60,000. Since the exhibition will not be maintained much longer in the overcrowded main museum and in the other buildings mentioned, I call particular attention only to the excellent order prevailing throughout, and mention as especially belonging to the provincial collection the great transparent grindings

of stones; minerals and fossils; the fossil invertebrates; the collection of general mineralogy and lithologic geology; the selected specimens of mammals and birds (also the other animals of the State); an excellent assortment of domestic fowls, with their eggs shown alongside; the Gould collection of shells; and, finally, the relief maps of the State (1 mile to the inch).

The furniture for many years has been of wood.

As a special feature I may mention that schools in the State of New York may borrow for a short time small collections for purposes of instruction.[a]

The New York State Museum, established in a spacious up-to-date building, will certainly in the future assume a commanding place among the museums of the country.

NEW YORK STATE LIBRARY.

The New York State Library is located in the third, fourth, and fifth stories of the west wing of the capitol, and ought to afford space for 3,000,000 of books. The space has, however, from time to time been otherwise occupied, so that now 150,000 volumes have to be stored in boxes. The library consists of 300,000 volumes, 125,000 bound duplicates (over 200,000 unbound), 250,000 manuscripts,[b] and 150,000 pamphlets—a total of over 1,000,000. As already remarked, plans have been drawn for a great new building for the library and museum combined. The university, together with the library and the other collections, now occupies about one-third of the great capitol building, which I must first mention for it holds a place among the most remarkable buildings of the United States.

E. A. Freeman, of Oxford, writes:[c]

But on the whole the American city which struck me most was Albany. Rising grandly as it does on both sides of the noble Hudson, it suggested some of the ancient cities on the Loire. It has the advantage, rather rare in American cities but shared with Albany by the Federal capital, of having one dominant building. The general look of the city carried me so completely into another part of the world that, if any one had come up and told me in French, old or new, that the new capitol was "le château de Monseigneur le duc d'Albanie," I could almost have believed him. * * * The building has a most successful contour; in its details it is a strange mixture of styles, not so much confounded as used side by side. This is accounted for by the history of the building, and by the employment of more than one architect. * * * There are parts which I can not at all admire; but there are other parts, those in which the column and round arch are employed, which certainly pleased me as much as any modern building that I have seen for a long time. When I say that the arches of the senate chamber seemed to me, as far as their general conception goes, worthy to stand at Ragusa, some will understand that I can say no more.

[a] See the small handbook of the Home Education Department: Loans to academies, p. 4, section of Museum illustrations (1898). With the loans of books and photographs mentioned in the chapter on traveling libraries these loans of objects are connected.

[b] These are documents such as we preserve in our archives.

[c] Some Impressions of the United States, New York, 1883, p. 245.

STATE CAPITOL AT ALBANY.

West staircase.

Albany is a hilly city. The hill on which the capitol is situated rises 150 feet above the Hudson, 51 feet above the level of the wide main street, which runs up from the river. The building is 300 feet long, 400 feet wide, and 108 feet high, and will have a tower 300 feet high. (The Reichstag building in Berlin is 395 feet long, 254 feet wide, and 81 feet high.) The inner court is 92 feet long and 137 feet wide. A straight staircase, with four landings and seventy-seven steps, the lower sixteen 100 feet wide, extends outward 166 feet from the building. The whole occupies 3 acres. It is built of white granite in the free renaissance style with wonderful stone masonry. The three staircases are of reddish sandstone, the western being particularly effective. Eleven elevators render access easy from one part of the building to another. The basement contains 144 rooms for heating, lighting, ventilating, storage, etc. The administrative rooms and the governor's magnificent state hall are on the first and second floors. These two floors combined include over 120 rooms. On the third floor are the magnificent halls of the two houses, the court of appeals, the historical collection, the library, together with over 50 rooms. The fourth story contains over 40 rooms, among them the offices of the university, the entomological, botanical, and ethnological collection of the State museum (the latter with rich archeological finds from the State of New York and its vicinity). There are also on the fourth and fifth floors additional library rooms. The building was begun in 1867, occupied in 1879, and finished all to the central tower in 1898. Its cost was originally estimated at $4,000,000, but over $25,000,000 have already been spent upon it. The architects were Fuller, Laver, Eidlitz, Richardson, and Perry.

The library, with its appliances planned and executed in the most minute detail, some of them in beautiful and artistic style, is particularly worth seeing. It is open daily, except Sunday, from 8 in the morning until 10 in the evening; lighted in the evening by electricity. On Saturdays, holidays, and from July to September, it closes at 6 p. m. It is accessible only from the third story. Until recently the director was also secretary of the university. He has under him 31 librarians, archivists, assistant librarians, assistants, etc.; 51 employees in all, and among them 37 women. The annual budget amounts to $75,000. The west wing of the capitol may be said to form on the third story a single room 290 feet long, 40 to 60 feet wide, the middle of which is occupied by the great reading room, 53 feet high, 67 feet long, 40 feet wide, which is connected with five additional reading rooms on the right and five on the left, all occupied with bookstacks, altogether with more than 300 seats. There are, moreover, two administrative rooms. The reading rooms are in part adorned with palms and other living plants. On the window side one may glance along the entire suite of nine rooms, 290 feet long, which, together with the fine view of the country and the distant mountains which may be enjoyed from

the windows, makes a very pleasing impression. On the fourth and fifth floors the same amount of space is at the disposal of the library, making in the two stories combined forty-one additional rooms, for the library school, the section of public libraries, the duplicate section, the library museum, the bindery, the children's reading room, etc. The library school has a lecture room in the seventh story of a corner pavilion. The museum contains a collection relating to library buildings and library administration of several thousand books, pamphlets, samples, formularies, models, etc., which are very exactly classified and catalogued. The collection is unique of its kind and extremely instructive.[a]

In the New York State Library particular attention is paid to law (60,000 volumes, principally American codes),[b] medicine (25,000 volumes),[c] sociology (36,000 volumes), instruction (16,000 volumes), history and kindred subjects (40,000 volumes), genealogy, bibliography, and Americana, as well as everything relating to the State of New York. It contains also a special collection of female authors and of books for the blind (of whom there are 5,000 in the State of New York) and for children, as well as for the State officials residing in Albany. About 2,200 periodicals are received by subscription or donation.

The building is fireproof. Some rooms contain extinguishers, lines

[a] In order to give an idea of the contents of the library-museum we add here the headings of the catalogue of the collection: Charts illustrating selection of books; Stacks; Lights, standards, etc.; Chairs, easels, floor covering, reference bookcases, shelf supports, folio shelving, shelving, tables, trays and trucks, miscellaneous fittings; Regulations for readers; Administration; Executive. Accession: Book plates, order, sample books (showing stamping, plating, etc.). Catalogue: Back blocks, bulletins, catalogues, cost of printed catalogues, catalogue drawers, drawer checks, drawer handles and labels, drawer rods, guides, handwriting, linotype, printed catalogue, card racks, size rules, catalogue trays, cataloguing miscellany. Classification; Reference. Loan: Card charging systems, loan desks, indicators, ledgers, registration books and cards, statistics, loan miscellany. Binding and repair: Binders, book corner protectors, book corners, materials, mending. Shelf: Book supports, dummies, maps and map cases, newspaper files, pamphlet cases, shelf labels, holders and guides, shelf lists, shelf miscellany. Care, cleaning, safety of building. General libraries: Home libraries, libraries for the blind. Children's reading: Historic development. Literary methods and labor savers, office fittings: Book holders, clips and paper fasteners, drawer fittings, files, folios, mailing envelopes and cases, paste, mucilage, etc., paper, pens, pencils, and erasers, punches, supplies, stamps, trays. Scrapbooks and files; Notebooks; Indexing; Engraving.

[b] In the excellent annual report of the director for 1898 it is stated on p. 28 that the time is near at hand when every prominent lawyer of the State of New York will be connected with the library by telephone.

[c] The report of the director for 1898, p. 35, expresses the opinion that the time is at hand when most of the physicians, also, of the State of New York will be connected by telephone with the library. In both cases a fee of 25 cents per half hour is to be paid when more than half an hour is required to give the information called for. The medical library is also used in the State of New York as a circulating library in the same sense as the organization of the traveling libraries described on a following page.

of hose, and alarm indicators. Only a part of the floors are covered with linoleum. They are mostly of parquetry or brick, with strips of carpet. Some of the book rooms proper have iron grates. The bookstacks and bookshelves are mostly of iron, the other furniture of wood, both strikingly elegant. There have recently been introduced sheet-iron waste-paper baskets with covers, because one of the ordinary waste-paper baskets was once set on fire. The folio volumes lie in their stacks on rollers, like those mentioned in connection with Columbia University. The cases for maps and photographs are constructed in a very practical manner. The separate drawers drop when drawn out to an angle of 75 degrees, so that the sheets may not only be conveniently examined as if on a slanting desk, but may also be placed for closer inspection on a lattice which covers the drawer. The books are bound in twelve colors, corresponding to the principal languages of the globe; for example, black represents German. This applies to all books which are bound for the library or in the library itself, and makes it easier to find them quickly. Current periodicals are kept in pasteboard boxes. Movable stacks for transporting books are constructed in a very practical manner.

For the library proper two extra elevators are in use. They are installed in a very ingenious manner, provided with electric bells and telephone. There are also staircases, partly of iron, partly of wood.

The arrangements for the care and use of the books show the greatest skill and attention to every detail.

The arrangement of the entire library is strictly according to the system devised by Melvil Dewey, who has been director since 1888. According to his ingenious decimal system, the figure signs contain the title of the book in a nutshell, and the books are arranged strictly according to the figure series. Each book has, therefore, its definite place and its prescribed sign. The system, which is followed elsewhere only in Columbia University and in smaller libraries, has here completely demonstrated its value. The card catalogues are made very accurate. They have in America extremely practical arrangements for such card catalogues. Even the price of the book is given on the later printed catalogue cards, which are furnished by the Library Bureau in Boston. Up to the present time there are over 300,000 cards in use, the greater portion arranged according to authors. Author and subject cards are kept separate, but in cases standing side by side; the author catalogue is in 140 drawers, each containing 1,200 cards; the subject catalogue is in 112 drawers. They are both made in duplicate. There is also an alphabetical list of all the authors represented in the library. In the accession catalogues one may find all possible data relating to any book.

The library publishes the following: Annual reports since 1819 (the eighty-first, of 1898, has 105 pages and is illustrated); bulletins with reports since 1891; additions to the bulletins since 1890, 4 numbers;

legislation bulletins since 1890, 10 numbers; history bulletins since 1898, 3 numbers; library school bulletins since 1891, 3 numbers; public libraries bulletins since 1893, 6 numbers; bibliography bulletins since 1895, 18 numbers; library catalogues since 1856, 9 volumes; indexes of university publications since 1897; syllabuses which contain bibliographies; a traveling library; finding lists, a mountain-side library, young people's libraries, a library for the blind, etc., in 56 and more numbers; annual lists of best books since 1895, and others; also many historical publications. In 1898, all told, 365,000 copies of such publications appeared.

This is further distinguished from many other libraries by the divisions for traveling libraries, exchange of duplicates, and the library school.

Traveling libraries division.—The special traveling libraries division, which has existed since 1892, contains about 45,000 volumes. Lots of 25, 50, 75, or 100 of the best books are lent for six months to public libraries, to any twenty-five taxpayers who meet in one place, to schools, associations for instruction (extension centers), study clubs, reading circles, as well as to any other organizations which are registered as such at the university and need books, for which security is to be given, and from 50 cents to $4 each is paid for transportation expenses. One hundred volumes are, for example, divided into fiction (22 per cent), history (18 per cent), biology (13 per cent), travels (11 per cent), science and useful arts (9 per cent), sociology (5 per cent), religion and ethics (4 per cent), fine arts (3 per cent), other literature (15 per cent). There are forty-one such miscellaneous sets, several of which have been duplicated ten times. The percentage of each subject represented is, of course, not always the same in the different sets. There are, moreover, seventeen collections of 25 or 50 volumes each on special subjects, such as political economy, finance, agriculture, French history, history of the United States, literature, etc. For these sets the best books in the English language are selected. There are also collected and lent out small libraries which relate not only to a special subject, but which also include what is more remotely connected with this subject and which therefore encourage the student to consider and study any particular question from every point of view. Such assortments of books are called environment libraries. Teachers, study clubs, and reading circles may themselves select books from the lists to a total value of $100 (combined libraries) and take them on the same conditions. For purposes of instruction teachers may also get as many copies of one and the same book as they may need for their pupils. The average price of each book may be placed at about $1. The books are sent out in handsome locked oak cases, which cost about $14 for every hundred volumes. Exact statistics regarding their use are returned to the library, which incloses in each book a card for this purpose. In 1899, 557 series were sent to 420

STATE CAPITOL AT ALBANY.

Home education department, with traveling pictures.

places. In 1898, 540 series were sent to 396 places, comprising 18,951 books, which passed through the hands of a large number of readers. In spite of their being instructive I can not here go into details with statistics on this subject.[a] A writer on this peculiar and, so far as I know, unique arrangement says:[b]

> The State of New York can well afford this offer of books to her citizens. The plan is at once generous and, in the highest sense, profitable, and is confidently commended to the consideration of other States.

In a like manner the State library lends from its great collection for purposes of instruction, photographs of paintings, portraits, buildings, and the like, including glass and frames, when desired. It also sends out wall pictures with magic lanterns.[c] A small fee is charged to cover the expense of shippage. Plate 12 represents a room of the library where such pictures are hung.

The *division of exchanges*, a peculiar establishment, is also connected with the library. There are 350,000 duplicates. Every library of the State of New York, every school, every lecture circle, every study club, every reading society, which is registered as such at the university and is organized according to the prescribed rules (we saw above that there are now in that State 1,511 such centers, large and small), may deliver to the university books for which they have no further use. In return for these they receive others of equal value, according to the choice of the recipient. About 20,000 volumes and pamphlets are now annually exchanged in this manner. This may, therefore, be regarded as an exchange book trade, which conducts its business without expense to the persons interested, who do not even have to bear the expense of transportation. All the surplus copies of the government publications of the State of New York are also placed in this duplicate collection, as well as the surplus stock of the works, books, pamphlets, handbooks, bulletins, reports, etc., printed by the university itself, for free distribution. Of the latter, hundreds of thousands

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[a] See, among others, Extension Bulletin No. 27, 1899, pp. 23–46.

[b] See W. R. Eastman, "A New Aid to Popular Education: Free Traveling Libraries," *The Forum*, January, 1895, pp. 616–621. I can not here reproduce the many interesting details. See, also, the small handbooks of the New York State Library: Traveling Libraries, 12 pages (1898), and Loans to Academies, 4 pages (1898), as well as the numerous Finding Lists and Subject Lists. For example, Finding List 41 (March, 1900) contains 50 volumes on religion (2), sociology (4), zoology (1), music (1), fiction (15), literature (5), descriptions and travels (7), biographies (6), history of South Africa (8), history of Philippines (1), subject list on education (subject 370, according to the Dewey system), 25 of the best books on education (February, 1900), among them books by Lange, Preyer, Spencer, Pestalozzi, and a biography by Fröbel; subject list on French history (subject 944), 50 of the best books on French history, among them Guizot, Scott, Taine, Sainte-Beuve, Mignet, Dickens, Hugo.

[c] See the small handbook of the New York State Library, Loans to University Institutions: Wall Pictures, 12 pages (1898).

of copies are printed. This department also exchanges apparatus, pictures, etc., for purposes of instruction.[a]

Library school.—It is now almost a rule in the United States that everyone who seeks employment in a library shall have attended one of the seven library schools which are located in Albany (New York State Library), Brooklyn (Pratt Institute), Philadelphia (Drexel Institute), Champaign (Illinois State Library School, University of Illinois), Washington (Columbian University), Madison (University of Wisconsin), Los Angeles, California, Amherst, Massachusetts, and Cleveland, Ohio. The four latter are only summer schools. Regular lectures on bibliography and library science are also delivered in a number of universities and colleges (Bowdoin, California, Colorado, Cornell, Iowa, Maine, Michigan, Wellesley).

The first school of the kind to which all others are more or less indebted for their existence was founded in 1887 at Columbia University, New York, by Melvil Dewey, who was at that time director of the university library, and removed to Albany in 1889. It includes a faculty of ten instructors, each of whom represents and teaches particular branches of library science. Six of the instructors are women, an example of the great attraction this branch has for women in America. The special branches are: Library economy, cataloguing, lending system, reading, bibliography, classification, history of libraries, advanced cataloguing, reference work, binding, library printing and editing, dictionary cataloguing, library building, indexing. The number of pupils is limited to 50. For admission an examination or the possession of a certain college degree is required. Pupils under 20 years of age are not received. The course is for two years, and lasts for thirty-eight consecutive weeks in the year. The weeks consist of five working days of eight hours each. Every pupil receives a table with all library appurtenances, at which he may work from 8 o'clock in the morning until 10 in the evening. The tuition fee for two years amounts to from $80 to $100. The expense of one year's attendance at the library school in Albany, including tuition fee, room, board, books, official study, travels, etc., amounts to from $325 to $625.

Instruction consists of the following: (1) Lectures by prominent librarians, publishers, booksellers, printers, bookbinders, and the like, and by the instructors of the school. (2) Reading and reports from books belonging to the special library school on the subjects of study. (3) Solving of difficult problems relating to cataloguing, bibliography, aids to readers, and the like, with debates. (4) Seminary exercises. (5) Practical training in the State library itself, as well as in the small libraries of the city. (6) Visits for the purpose of study to the libraries of New York, Boston, etc., to the great publishers, printing offices, bookbinderies, art institutes, bookstores, book auctions, secondhand

[a] See Handbook No. 1, Outline, pp. 36 and 37, and No. 10; Study Clubs, p. 13.

bookstores, etc. (7) Object lessons: Everything referred to in the lectures is, when possible, exhibited in the original or in models, plans, or drawings. Thus, for example, one may see ten different kinds of American and European library book stacks in practical use beside one another, and by actual trial become acquainted with the best. Different portions of the library are fitted up according to different models, in order that the students may learn by comparison. (8) Finally, the pupils are made acquainted with the above-described educational methods of the New York State University, as they are in many respects related to library interests.

In the first year the following subjects are treated: Exercises in cataloguing for beginners, elementary bibliography, accession department work, dictionary cataloguing for beginners, classifying for beginners, shelf work or disposition of books, systems of lending, and of bookbinding. For students of the first and second years together, course of reading, scope and founding of libraries, government and service, regulations for readers, library buildings, reading, literary methods and book making, library bookkeeping, library museum, personal collections. In the second year, are taught bibliography for advanced students, reference work, exercises in cataloguing for advanced students, dictionary cataloguing for advanced students, classifying for advanced students, history of libraries, and original bibliography. Finally, a dissertation is required, and then, after an examination has been passed, a degree is conferred (bachelor, master, or doctor of library science). The best scholars receive scholarships and fellowships, up to $500, and may look forward to an early appointment in Albany. Up to October, 1898, the library school had filled 642 positions with its pupils. Summer courses are also held during the holidays; and private instruction and instruction by means of correspondence are also given.[a]

The existence of such schools explains the advanced condition of library science in America.[b]

It is recognized "that the influences of the New York State Library are as yet the strongest that exist to raise the standard of librarian-

[a] See also Handbook No. 7, Library School, 1897, 82 pages; Handbook No. 11, Library Handwriting, with very many useful hints, 1898, 24 pages; Handbook No. 14, Library School, Summer Course, 1899, 28 pages; and State Library Bulletins, Library School No. 3, April, 1899, 12th Annual Report of Library School, 1898, 25 pages.

[b] In Germany a chair for library science ("Buch-und Schriftwesen") exists only in Göttingen and Leipsic. (In Leipsic, however, the professor does not lecture.) Other lectures on library science in German universities are sparing and more of the archeologic-historical kind. In Prussia, after a voluntary service of two years in a library, an examination must be passed before appointment, but not in Saxony and Bavaria. The German library employees are, however, mostly scientists. In America there are but few in this particular branch, while among us there is rather a lack of specially educated minor employees. I think that more attention should be paid to library science in the German universities than is now the case. If libraries are intellectual eating houses, care should be taken that the dishes are well served.

ship and to advance the best educational work now carried on by the modern library."[a] The New York State Library aims at the greatest conceivable utilization of all of its literary treasures. Its object is to send every book where it will do the most good. I left this institution carrying with me the highest respect for its director's talent for organization.

The University of the State of New York contributes an astonishing amount to the universal distribution of knowledge in a manner quite peculiar to itself. I am convinced that a great future lies before it. Its work, however, has already received the greatest recognition, as shown by the circumstance that at the Paris Exposition of this year (1900) it received the remarkable number of three first prizes ("grand prix"), one to the State Museum specially for its paleontological publications, a second to the library specially for the establishment of traveling libraries and the home-education department, and a third to the college department for technical education.

III.—BUFFALO.

[On Lake Erie near Niagara, with over 350,000 inhabitants.]

8. BUFFALO PUBLIC LIBRARY.

In the year 1836 the Young Men's Association of the City of Buffalo was founded as a municipal library. In 1885 a house of its own was erected, the Buffalo Library, which, in 1897, was reorganized as the Buffalo Public Library. The building, also called Library and Art Building, is massive and fireproof, in the Romanesque style of architecture, with triangular ground plan, about 300 by 250 by 175 feet in size, and cost nearly $375,000—about the same amount as the site. Situated on Lafayette place in the midst of the business houses of a great industrial city, the exterior is already badly discolored by smoke. It is now occupied by the following:

In the basement, the museum of the Buffalo Society of Natural Sciences; on the raised ground floor and the second story, the public library; also on the second floor, the collections of the Buffalo Fine Arts Academy and the Buffalo Society of Artists; on the third floor, the collections of the Buffalo Historical Society. Within a short time, however, the entire building will be given up to the library. The Natural History Museum will secure a home of its own from a bequest of about $250,000. The Art Academy, which was founded in 1862, will, together with the Society of Artists, with which the Art Students' League is also connected, move into the Albright Art Gallery, now in course of construction,[b] for which $500,000 are to be expended by private individuals. Finally, the collections of the Historical Society, which was also founded in 1862, were to be exhibited in connection with

[a] Eighty-first Annual Report, 1898, New York State Library, 1899, p. 11.

[b] Now finished (in Delaware Park)—1903.

BUFFALO PUBLIC LIBRARY.

the Pan-American Exposition in Buffalo in 1901.[a] As all this would make a radical change in the museums mentioned, I limit myself to a few words concerning the Natural History Museum, and speak of the library in a somewhat more detailed manner.[b]

MUSEUM OF THE BUFFALO SOCIETY OF NATURAL SCIENCES.

The Natural History Society of Buffalo was founded in 1861. It is under the formal control of the University of the State of New York, in Albany, and its object is the advancement and the study of the natural sciences. Lately it has devoted itself particularly to making collections of the local fauna and flora, and for this purpose is divided into fourteen sections. There is a president at the head of the institution. In 1898 it had at its disposal an income of $3,500, of which $625 were derived from membership fees, $250 appropriated by the city, $1,250 interest money, etc.

The present director of the museum is a woman (conchologist). The different sections are presided over by professional scientists or amateurs, who serve without pay. The best parts of the collection are the minerals, the fossils, the shells, and the herbarium. A larger series of deformed mound skulls should be noted. The museum contains, all told, about 60,000 natural history specimens; the library, 4,300 books. It is open daily from 9 to 5, Sundays from 2 to 5; admission free. The number of visitors last year was 105,000. The society has 250 members, who pay $2 or $5, and 160 corresponding members. The publications are as follows: Annual reports (the one of 1898, with 18 pages; the earlier reports were longer, but none appeared in 1899), bulletins with illustrations (6 volumes); see also "charter and by-laws * * * together with the will of Dr. George E. Hayes * * * 1890." Regular lectures are delivered and meetings of the society are held in one of the larger rooms. The Buffalo Field Naturalists' Club of the Buffalo Society of Natural Sciences, founded in 1880, is affiliated with it. There is also a Buffalo Microscopical Club, founded in 1876, which publishes Transactions.

While the unfavorable exhibition space in the basement, which is only 14 feet high, and the limited means at the disposal of the society have hitherto prevented it from displaying its already considerable collection to the best advantage, it can hardly be doubted that the Natural History Museum of Buffalo will, in its new location, receive

[a] The new building, where the collections of the Historical Society are now housed, stands also in the Delaware Park—1903.

[b] A paper by W. O. Chapin: The Buffalo Fine Arts Academy, an historical sketch, 1899, 77 pp., and an article in the *Pan-American Magazine*, May, 1900, pp. 2-5, with plan and illustrations of the Albright Gallery, give information regarding the art collections. For information concerning the Historical Society the Annual Report for 1898 (104 pages, with illustrations) may be consulted. The object of this society is to study, collect, and preserve everything relating to the history of the western part of the State of New York and to the city of Buffalo in particular.

an impetus corresponding to the importance of this populous and wide-awake city of the future, to its handsome and favorable geographical position, and to the patriotism of its intelligent inhabitants, who will not remain behind other cities of the Union.

LIBRARY.

The main library is arranged on iron bookstacks with wooden shelves in a hall 164 by 47 feet and 21 feet high. This hall is located on the raised ground floor, which contains several handsome, spacious, well-lighted reading rooms, as does also the second story. The library is excellently fitted up, though not with the elegance of the Columbia University library in New York or the State library in Albany. Under municipal control, as well as under the supervision of the University of the State of New York, in Albany, it is governed by a board of directors, consisting of 10 members, with a president and a superintendent, who is the actual director. It derives its principal income from the city, amounting to four-fifths of four one-hundredths of 1 per cent of the whole taxable property of the city of Buffalo. That amounted to $8,250 in 1899.[a] Its total income is $90,750. Of this sum, $40,500 were needed for the salaries of 79 employees. Sixty-seven are employed in the library itself, 12 in the building, including 45 women. One of the higher female employees receives $900 a year.

There are 150,000 volumes in the library, together with 10,000 pieces of music, etc. There are subscribed to, or received as donations, 285 periodicals and 73 newspapers. The increase for 1899 amounted to 21,000 volumes, which cost $21,725, and 1,500 donations. Nearly seven thousand dollars was needed for binding. The books are catalogued and arranged according to the Dewey system, which works excellently. There are three special catalogues in use: (1) The dictionary catalogue for the public, which includes the author, title, and subject cards in one alphabetical series; (2) an author and title card catalogue for the employees; and (3) a shelf list. The number of cards of these three catalogues are for each book about four, two, one, respectively; therefore for each book about seven. The dictionary catalogue is well advanced, and replaces a subject catalogue, which is still in use, and which is a shelf list with many references.

The entire force of employees follow with the greatest zeal the one aim to make the library as useful as possible for popular instruction,

[a] Boston, with 550,000 inhabitants, in 1897, in a similar manner, gave for like purposes, $275,000; Chicago, with 1,700,000 inhabitants, $250,000; Philadelphia, with 1,200,000 inhabitants, $125,000; Cleveland, with 385,000, $75,000; St. Louis, with 650,000, $75,000; Pittsburg, with 290,000, $67,500; Indianapolis, with 185,000, $42,000, etc. In nearly every Massachusetts town the dog tax is devoted to the support of the public library. "The more bark, the more book" (American *Review of Reviews*, September, 1899, p. 328).

consequently the greatest imaginable liberality prevails, together with exemplary and painstaking order. Any resident of Buffalo may borrow any book for fourteen days free. A neglect to follow any of the rules is punished by fines, which in 1899 reached a total of $2,750.[a] The library is open daily from 8.30 or 9 a. m. to 9 p. m. (with electric lighting); also on Saturdays and holidays from 11 a. m. to 9 p. m., but on these days books are not loaned out. The children's department is open on school days from 2.30 p. m. until 6 or 7 p. m., and on Saturdays and holidays, that is to say, days on which the schools are closed, from 9 a. m. until 6 or 7 p. m.; Sunday from 2 p. m. until 6 p. m.

Each room has direct telephone communication with every other room. The building being fireproof, it is thought sufficient to depend upon vigilance without any other precautionary measures. The heating is by steam. The engines are located in a separate house.

A characteristic feature of this library, which, indeed, exists elsewhere, though only in a few places, is the open-shelf department. A collection of 17,000 volumes, in wall cases in a room 70 by 30 feet large, is here, under supervision, directly accessible to the public, not only to read on the spot, but particularly to choose for home use. Anyone can go right up to the shelves and take the books out. This is not a so-called reference library, such as every important library possesses in reference works, dictionaries, and the like (there is also such a reference library of 2,000 volumes), but the section was established in order to afford the reader an opportunity to select the books themselves instead of by title only. This method is so popular that in 1899 each book was loaned out on an average sixteen times. The collection also includes German (877) and French books. Of the 17,000 volumes, 10,000 relate to fiction.

In 1899, 888,000 volumes, all told, were loaned out to 57,000 persons in three hundred and five days,[b] of which 67 per cent were fic-

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[a] A book may be taken out for fourteen days and once renewed for an equal length of time. Some new books are lent for one week only. Whoever keeps a book over time is fined two cents a day. The comparatively large total of fines is composed almost entirely of fines for one, two, or three days. Compensation must be made for damages, and lost books must be replaced. Whoever fails to meet his obligations receives no more books.

In the New York State Library at Albany (previously referred to) there is a fine of one cent a day for keeping a book over time. For taking a book out of the library without having it entered the fine is 50 cents. The rules are here very detailed in their conception (see Eighty-first Annual Report of the New York State Library, 1899, pp. 63–67). Formerly in a small town of Ontario, Canada, a borrower was fined a half a farthing per shilling of its value for every drop of tallow which he allowed to fall on a book. This rule is so curious that I can not refrain from mentioning it.

[b] The Boston Public Library lent out 1,200,000 books in 1898, the public library in Chicago 1,300,000 (1899, 1,700,000), that in Philadelphia 1,600,000, that in Cleveland 900,000, St. Louis 600,000, Pittsburg 100,000, Indianapolis 300,000, etc.

tion.[a] 8 per cent literature, 6 per cent history, 3½ per cent travels, 3 per cent natural sciences, etc. As many as 684,000 volumes were borrowed from the main library, and 204,000 from the seven delivery stations in the city, which have been established for the convenience of the public, or indirectly through schools or traveling libraries (see below). In the reading room, moreover, 37,000 volumes were called for from the main library. Since the opening of the public library, out of 2,000,000 volumes loaned, about 1,000, to the value of $725, have been lost in two years and a half; the present rules, however, encourage the hope that the number will diminish with time. Other special arrangements are the following:

Series of books are loaned to schools for a considerable time, according to the choice of the teacher. The children take these books home with them. Thus in 1899, 22 primary and secondary schools, with 358 classes, received 153,000 volumes and 5,000 pictures. Further, well-selected series, called traveling libraries, are likewise loaned to certain institutions. Thus in 1899, 127 series, with over 4,000 books, were loaned to 28 fire-engine houses, to 7 police stations, and to 5 hospitals (for the employees), which in all brought 8,600 into circulation.

Especial care is also bestowed upon a children's library, which is much frequented. It is for children under 14 years of age. When they come with dirty hands they are sent into the wash room. In a pleasant, well-lighted room, with pictures on the walls and adorned with growing plants and cut flowers, 9,000 books are displayed in open wall cases, freely accessible, under proper supervision, to everybody. Four thousand of these books are fiction. In 1899, 115,000 volumes were lent out of this department for home use. Even colored picture books are lent to small children. On Saturday mornings and Sunday afternoons the assistant in charge spends an hour reading to the children or telling them stories. At Christmas time an exhibition of books which are suitable for presents is held and printed price lists are distributed; for example, see List of Books recommended as appropriate for Christmas Gifts to young Folks (November 28, 1898, 6 pages), in which is noted the age for which each book is suitable. A library assistant is in attendance to give advice on this matter to visitors. There are also printed reading lists—for example, American History for young Folks (4 pages).

About once a month lists of the new acquisitions are posted on bulletins and larger lists are from time to time printed; for example, "No. 17, July 1, 1899, recent additions: History and biography, sociology, science and arts, philosophy and religion, general literature, fiction"

[a] The fact must not be lost sight of that such books may be read much more quickly than others, and that only good ones are procured. See explanatory remarks on this subject by Herbert Putnam, *North American Review*, CLXVI, 1898, p. 664.

BUFFALO PUBLIC LIBRARY.
A corner in children's room.

(4 pages, with 230 titles). Reading lists on special topics are also published, for example, Good books on Electricity for popular Reading (2 pages); Greek Sculpture, in connection with the Exhibition of Casts in the Buffalo Fine Arts Academy (3 pages); Interesting Books for Boys and Girls from 14 to 18 Years (9 pages). Other publications are: Finding list of history, travel, political science, geography, anthropology (224 pages, octavo, October, 1898), and Descriptive Catalogue of the Gluck Collection of Manuscripts and Autographs in the Buffalo Public Library (149 pages, on handmade paper), July, 1899.

Every year there appears an annual report, the third one for 1899, with 55 pages and a map of the city, on which all delivery stations, also the schools, fire houses, and police stations, to which the library gives books, are designated in red. The last annual report of the Buffalo Library appeared in 1897, as the sixty-first (with 90 pages), and the last annual report of the Young Men's Association, in 1886, as the fiftieth (with 51 pages). The first report of the Buffalo Library counts, therefore, from the fifty-first, while the public library since its establishment in 1897 has numbered its reports from one, and states on the title page that it is at the same time such and such a year of the Buffalo Library. The third was the sixty-fourth year.

Branch libraries are now being established in the city.

With the wise administration which we have described, and the active, constantly increasing patronage of the people on the one hand and the prospective great development of the city and the devotion of its citizens on the other, a much wider sphere of activity and a future rich in blessings may confidently be predicted for the Buffalo Public Library."

"In the State of New York there were, in 1898, 408 public libraries with a ratio of 1,800,000 books to 7,000,000 inhabitants; altogether 983 libraries with 5,400,000 books (Extension Bulletin, No. 27, University of the State of New York, 1899, pp. 48 and 50).

In the State of Massachusetts, in 1899, there were for 3,000,000 inhabitants 344 public libraries with 3,700,000 books, each of which were lent on an average more than twice. During the last fifty years $8,000,000 in cash have been donated or bequeathed for the buildings and books, besides presents of books and other collections. In 1899 only 7 towns with less than one-half per cent of the total population were without a public library. In 1895 Massachusetts had in all its libraries combined over 7,000,000 books, to the value of $10,000,000 (9th Report Massachusetts Free Public Library Committee, quoted in American *Review of Reviews*, September, 1899, p. 324).

In the State of New Hampshire public libraries, like public schools, are obligatory.

In the United States, with its 70,000,000 inhabitants, there were, in 1896, 4,026 public libraries, society libraries, and school libraries of over 1,000 volumes each, a total of 38,500,000 books and pamphlets, of which 2 libraries had over half a million books, 4 between 300,000 and 500,000, 28 between 100,000 and 300,000, 69 between 50,000 and 100,000, 115 between 25,000 and 50,000, 411 between 10,000 and 25,000, 630 between 5,000 and 10,000, and 2,727 between 1,000 and 5,000. Of public libraries with over 3,000 volumes there were 627, with a total of 9,000,000 books, which were loaned out for home use on an average three times a year (United States Bureau of Education No. 232, 1897).

IV.—CHICAGO.[a]

Chicago, on the shore of Lake Michigan, is the metropolis of the State of Illinois, which, with a population of 4,800,000, ranks as the third largest State in the United States. In 1890 Chicago numbered 1,700,000 inhabitants, a population surpassed by but one city in the entire country. In 1837 the place was still in the midst of a marsh, with only 4,000 residents. In 1871, when the population had grown to 300,000, the city was almost blotted out by fire, so that we might be justified in dating its real foundation from that time.

Its architecture exhibits more evidence of an American national style than is seen in the other great cities of the eastern part of the country. In originality, in youthful vigor, and in the astonishing rapidity of its development Chicago excels all, with the prospect of a yet greater future. The motto "I will" is often found on the allegorical figure of the city, and the words appear to me most suitable to indicate the energetic, aspiring character of its citizens.

9. FIELD COLUMBIAN MUSEUM.

The Field Columbian Museum is a private association, established in August, 1893, during the World's Columbian Exposition, under the name of the "Columbian Museum of Chicago" for "art, archæology, science, and history."[b] In June, 1894, it was rechristened in honor of Mr. Marshall Field, of the immense wholesale and retail establishment of Marshall Field & Co., who, immediately after its foundation, presented to the museum $1,000,000, on the condition that a sum equal to half that amount should be given by others. This condition was fulfilled within a few weeks by the generosity of some 1,200 persons, who subscribed from $1 to $100,000 each. A fund amounting to about $250,000 from these gifts is invested.

The chiefs of the different departments of the Columbian Exposition, especially those of mining, metallurgy, anthropology (in its widest sense), and transportation, had sought, in accordance with a plan devised as long ago as 1891, to bring together materials for a permanent museum. In this enterprise Prof. F. W. Putnam, now of the Peabody Museum in Cambridge, Massachusetts, was especially active, and at the breaking up of the exposition there was a most favorable opportunity for obtaining all kinds of collections.[c] This

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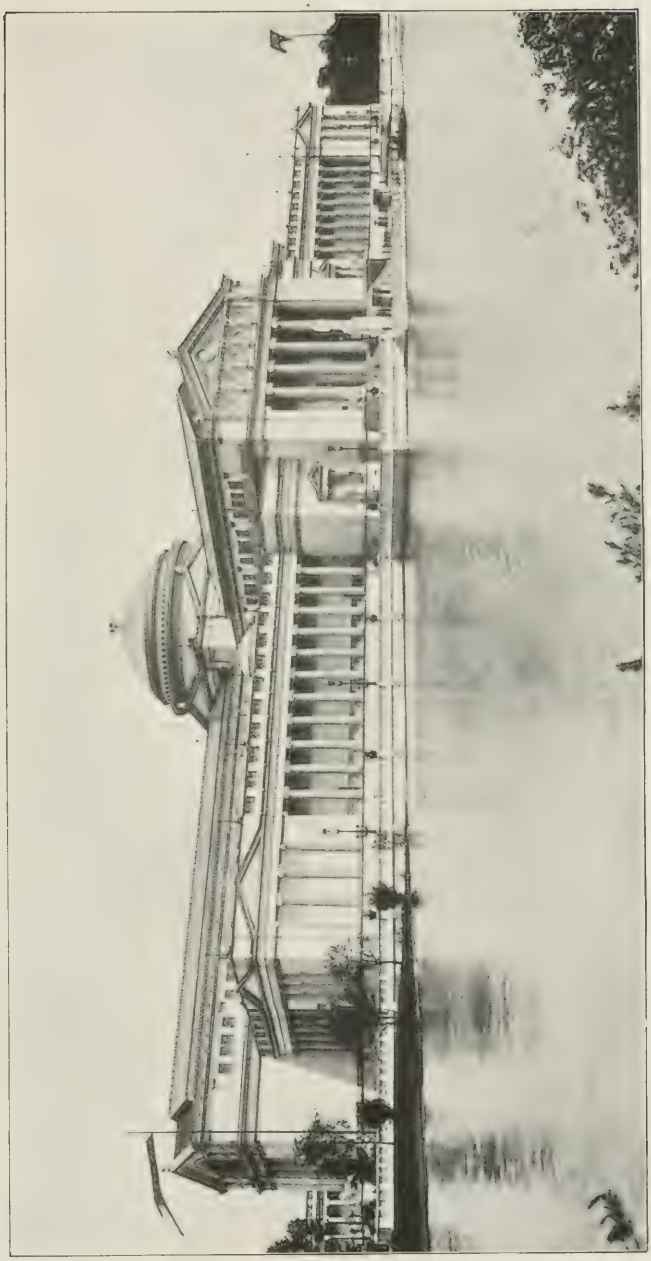
[a] Comprising Part II of Über Museen des Ostens der Vereinigten Staaten von Amerika, by Dr. A. B. Meyer.

[b] The corporation was especially founded "for the accumulation and dissemination of knowledge and the preservation and exhibition of objects illustrating art, archæology, science, and history."

[c] For instance, there were bought, at the close of the exposition, the collections of Paraguay, Peru, Java, and Samoa, as well as those of the dealers in natural history, Hagenbeck, of Hamburg, and Ward, of Rochester, New York, the last costing $100,000. Large collections were given by Russia, Japan, Corea, Ceylon, Siam, British India, Mexico, Central America, and all the States of South America.



FIELD COLUMBIAN MUSEUM.

South front.

peculiar genesis explains the vast scope of this Chicago institution, perhaps embracing too wide a field, as we shall see, and accounts for the astonishing repletion of its overcrowded cases, as well as for the fact that the museum, in true Chicago style, could, from its very beginning, claim a place among the leading museums of the world, an apparently solitary example in the history of such institutions. There was also the extraordinary advantage of having available among the exposition buildings one of more substantial construction than the rest, the one provided for the exhibit of fine arts. It is a wide-spreading structure in Ionic style of the Spanish type, designed by Charles B. Atwood. It has about 6 acres of ground space available for exposition purposes, or almost double the space of the old market at Dresden, and stands by itself in Jackson Park, an area of 521 acres, immediately on the shore of Lake Michigan, which is nearly as large as the Kingdom of Bavaria. The main front of the building faces north toward the city; the south front (Plate 15) faces a large pond; the east side is toward the lake. Its orientation is of no importance to the collections within as the building is lighted throughout from above. The ground plan (fig. 32) shows two naves, 110 feet wide, 77 high, and 556 and 333 feet long, crossing each other at right angles. To these are adjoined transverse and longitudinal halls. A central rotunda is 140 feet high. There is annexed to the north front on either side, a pavilion 223 feet long by 133 feet wide, divided into separate rooms. The building with its classical style presents an imposing effect from a distance, but on near approach its beauty is marred by the dilapidated aspect of the exterior, for the white covering of the brick wall is here and there damaged and broken away. The simple division of the interior is very favorable for finding one's way in the extensive building. The naves are provided with galleries (fig. 33), but the ordinary character of an exhibition hall, in which most heterogeneous objects are placed near together,[a] generally prevails, and there is lacking that intimate charm which can only be afforded by a building designed for its special purpose. Although it would be easy to imagine a better building (the American Museum of Natural History in New York, already described, being incomparably better) yet there are in Europe new museum buildings much inferior to that of the Field Columbian Museum. Its principal faults are defective skylighting in some portions and insecurity from fire because of the large amount of interior woodwork. It is to be hoped that it may continue to be spared the disaster of a conflagration. The extraordinary quantity of mate-

[a] For instance, a few steps from the collection of shells there stands furniture belonging to the Danish poet, Hans Christian Andersen, and also stocking and glove machines from Chemnitz dating from 1834. This must somewhat perplex the lay public, irrespective of the fact that the green upholstered sofa with two similar stools, even though it belonged to a celebrated poet, impresses a visitor strangely in a museum of high standard.

rial exhibited in the building, and the contracted space devoted to work rooms and storerooms, has caused such a crowded condition that a new building is already talked of, and indeed it is thought that the museum may be united in one large building with the John Crerar Library, described beyond. This combination would be an excellent plan, and Chicago would thereby be doing an admirable deed.[a] With such a condition of affairs and with the rapid development of everything in that country, it is not worth while to give a detailed description of the

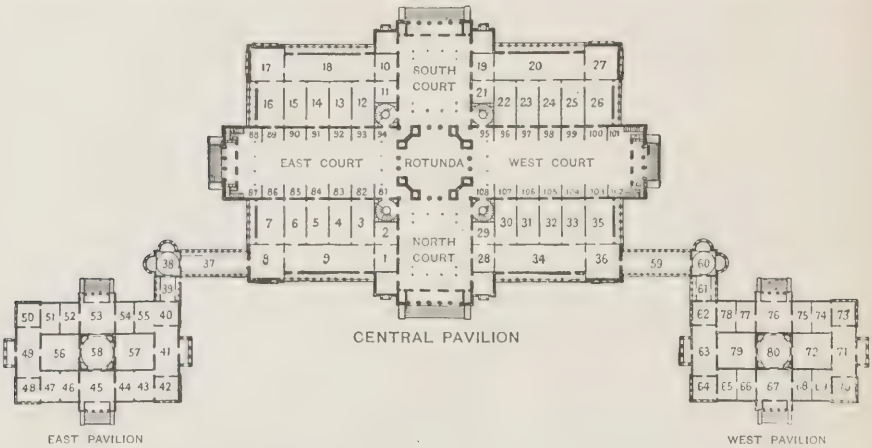


FIG. 32.—Field Columbian Museum. Plan of ground floor.

1, 16–18, American aborigines; 2, Korea; 3, 5, Asia; 4, Oceania; 6, Africa; 7, China; 8, prehistoric Hopi pottery; 9, Egyptian archeology; 10–13, northwest coast of North America; 14, California; 15, southwestern United States; 19–21, mammals; 22, fishes, reptiles; 23, osteology; 24, invertebrate animals; 25, shells; 26, 27, birds; 28, reading room; 29, library; 30, 31, South America; 32, gems and jewels; 33, ceramics; 34, lecture hall; 35, 36, 59, paleontology; 37, 38, marine transportation; 39, human burden bearers; 40, pack animals; 41, 57, Pennsylvania Railroad collection; 42, railroad appliances; 43–53, 56, evolution of the locomotive from 1680 to 1876; 54, street cars; 55, vehicles; 58, models and statuary; 60, 61, geographic geology; 62, meteorites; 63, 64, systematic mineralogy; 65, dynamic geology; 66, lithology; 67, 68, building stones; 69, mineral combustibles; 70, carbon minerals; 71, petroleum; 73, office of department; 75, laboratory; 76, iron and steel metallurgy; 77, clays and sands; 78, salts, asbestos, etc.; 79, ores and metallurgy, base metals; 80, mineral trophies; 81–94, zoology of America; 95–108, zoology; west court and south court, zoology; north court, European archaeology; east court, American archeology; rotunda, sculptures in commemoration of Columbus and the exposition.

museum structure. I will therefore speak only of the organization of the fire service, which is unexcelled in careful precautions.

No one is allowed to smoke even in the vicinity of the building, and within it almost no fire is permitted. When, for example, a preparator needs fire for his work, permission must be had from the director and the fire is managed with extreme precautions. All woodwork is coated with fireproof paint. In some instances, cases containing objects,

[a] Quite recently (1903) it is understood that Mr. Marshall Field has given $10,000,000 for a new building on the lake shore in the center of the city. The combination with the John Crerar Library has been given up and the library is erecting a building of its own (1904).

possibly subject to spontaneous combustion, are covered with strong asbestos paper five-eighths of an inch thick, and the neighboring walls are similarly covered to a thickness of an inch and a quarter. The heating plant is placed in a detached building. Three trained men from the city fire department, together with the employees of the building, have charge of the service, day and night, without and within. These three firemen each perform sixteen hours of service during the twenty-four hours, and the entire building is inspected every four hours, the inspection being registered by a service clock of the "American Watchman's Time Detective System," and the record is laid before the director every morning. The doorkeepers and watchmen are drilled twice a month. The greater number of those em-

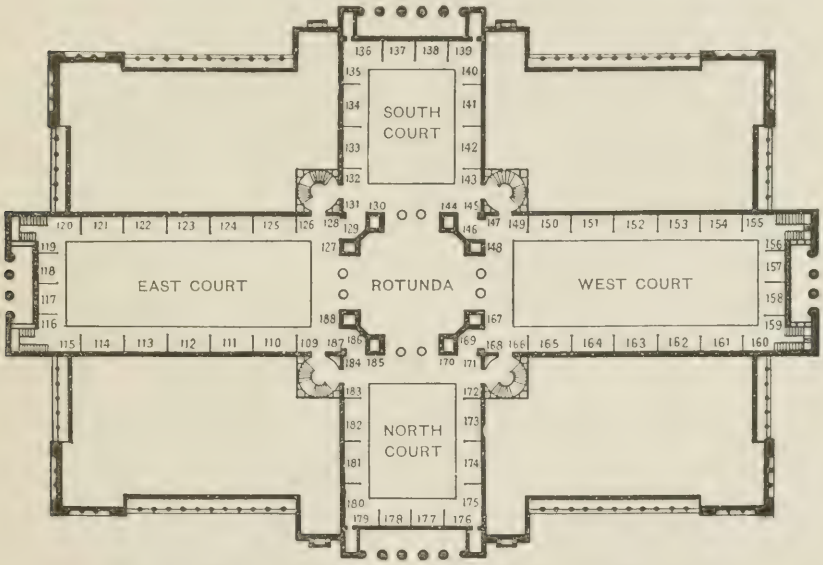


FIG. 33.—Field Columbian Museum. Plan of gallery. 109–188, Botany.

ployed were previously in the service during the exposition, and may be considered as veteran firemen. The electric conduits in the building, which supply 40 arc lamps, are carefully inspected daily and put in order. In each of the four wings of the principal building the following apparatus is distributed: 2,500 feet of hose upon racks and reels, together with a hose carriage; 4 25-foot fire ladders; 7 fire poles of various lengths, with iron points and hooks to break through ceilings or to pull them down; 26 fire axes and 145 fire buckets. There are 8 fire hydrants within the principal building and 12 on the exterior, also 4 hose reels upon the galleries and 1 in each of the two side buildings. There are also provided and distributed 1 large chemical fire extinguisher of 55 gallons capacity, supplied with 300 feet of hose, to reach every portion of the building; 42 chemical hand extin-

guishers, each of 4 gallons capacity, and 148 filled buckets with automatic covers—100 of them on the roof, filled with about 442 gallons of water. There is also available the special high-water pressure system of the park, and definite arrangements are made with the city fire department for such extra service as may be needed. Fourteen fire alarms are distributed throughout the building, which give signals, both in the room of the fire watch and in the distant room of the director. The offices in the upper story are provided with a mercurial automatic fire-alarm system. Upon the roof a series of mercurial thermostats have been placed which, at a temperature of 175° F., give the signal of alarm in the room of the fire watch, so that the situation of the fire is at once known.[a]

On account of the isolated location of the museum, everything that ingenuity can devise has been done to diminish the danger from fire, liable on account of the combustible nature of the building and furniture, and to meet accidents that may occur. I have described this system in such detail to show how careful people have become in a city which has burned down within the memory of man. But with us, too, just as much care is desirable, for it is much more important to prevent a fire in museums, or to stop it when first started, than to extinguish it with the aid of the fire department, for the water thrown by engines is as destructive as the fire itself. A proof of this was given in January, 1901, at the fire in the old pathological institute of the Berlin University, in charge of Professor Virchov, where valuable material was destroyed by the water thrown to extinguish the fire.

It impresses a German to find in America that generally no lightning rods are in use—none at all, for example, on this museum. In Saxony there are very stringent police regulations in this regard. On inquiry about this matter in the United States I was told that the electric wires served the same purpose.[b] Considering the great dryness which exists in summer, together with the high degree of heat in the United States—I myself, on September 5, 1899, at 5 p. m., endured a temperature of 98° F. in Chicago[c]—I believe that in spite of all the careful precautionary regulations, the expensive collections of the Columbian Museum are seriously endangered in this building, and I

[a] For security against burglary a watchman in the halls of gems, as well as one at the entrance, must give assurance of his presence by a bell signal every quarter of an hour. There are also electric alarms in the same hall.

[b] I much doubt the accuracy of this view, for the protecting effect of lightning rods can not, in many cases, be denied, though nowhere in the United States are they required by police regulations, and what is more to the point, the fire insurance companies do not demand them; while on the other hand, mortgagees frequently demand security of buildings against cyclones.

[c] This is blood heat. The highest observed temperature within a short time before was 100° F., on July 16 and 17, 1887. This was first exceeded on July 11, 1901, when it was 102° F.

would congratulate the city should it become able to place this collection in a fireproof structure.

When the museum was established the following seven departments were provided: Anthropology, geology, botany, zoology (exclusive of ornithology), ornithology, industrial arts, with two sections of transportation and railroads, and Columbus memorials. In 1896 there was added to this the department of monographic collections with the two sections, that of printing and graphic arts and musical instruments. In 1897, however, the departments were reduced to five: Anthropology, botany, geology, zoology (exclusive of ornithology), and ornithology. Under anthropology is now embraced everything that was formerly in anthropology, industrial arts, transportation, railroads, Columbus memorials, printing and graphic arts, and musical instruments. That there exists any essential reason for creating a department of ornithology distinct from zoology is not apparent. The anthropological department occupies the entire east wing (1–18, ethnography; 81–94, America), the entire central pavilion (Europe, Asia, Africa, and America and statues in the rotunda), a portion of the west wing (30–33 industrial arts), and the entire east portion (transportation). The botanical department occupies all the galleries (fig. 33); the geological department the entire west pavilion and two halls of the western wing (35–36); and the zoological, including the ornithological department, the greater portion, or two-thirds, of the west wing (19–27, 95–108). The installation is mentioned somewhat more in detail in the legend to fig. 32.

The administrative organization is as follows: A board of 15 trustees, 6 of whom constitute a quorum, is divided into four committees, executive, finance, building, and audit. To this board are subject the salaried officials of the museum, at whose head stands the director who, up to this time, has not been a trained scientific man. Each section has a curator. Besides this, the anthropological and zoological sections have each an assistant curator, and the geological two assistant curators. The assistant of the anthropological section has special charge of ethnology. One of the geological assistants has charge of paleontology. There are altogether nine professionally trained employees, a number entirely insufficient for this large museum. Finally, there is a librarian, a recorder, and 79 subordinates, including 2 collectors, 1 osteologist, 3 taxidermists, 20 preparators, writers, stenographers, etc., 2 modelers, 1 inspector of buildings, 4 engineers, 6 cabinetmakers, 4 painters, 12 doorkeepers, 5 laborers, 16 attendants, and 3 fire guards.

The force is employed from 8.30 a. m., in some cases from 7 or 8, until 5 p. m. or till 5.30 p. m. in June, July, and August, with an hour for luncheon. The hours of labor in American museums are usually longer than in those of Europe.

The "Corporation of the Field Columbian Museum" has also the following members:

1. Corporate members, at present 65, who pay $20 entrance fee and $5 annually.

2. Patrons, now numbering 5, who have rendered some special service to the museum.

3. Honorary members, at present 4, who have distinguished themselves in science, art, or mechanics.

4. Life members, now 81, who have contributed $500 at one time.

5. Annual members, now 415, who pay $10 a year.[a]

The expenses of the museum from October 1, 1898, to September 30, 1899, were, approximately, $129,000,[b] divided as follows: Salaries, $63,570; heating and lighting, $8,102; repairs and alterations, $10,560; furniture and fixtures, $17,485; books, binding, etc., $734;[c] collections, etc., purchased, $14,703; installation expenses, $3,792; publications, $1,683; general expenses, $5,460; fire protection, $2,836.

The receipts were as follows:

From South Park commissioners	$15,000
Interest on investments, etc	21,589
Gifts	6,750
Members' dues	3,830
Checkroom fees (5 cents each)	1,082
Admissions (25 cents each)	5,192
Sale of guide books	358
Cash on hand at beginning of year	5,185
Securities sold	71,625

In 1899–1900 the total receipts were $125,052, of which $85,000 was obtained from the sale of securities. The interest on investments had dropped from $21,589 in the previous year to $8,034.

The rich merchants of Chicago would do well to so endow the Field Columbian Museum that it would not be necessary to encroach upon its capital for its ordinary running expenses, but if not the city fathers will certainly undertake this duty. I do not in any case doubt, however, but that the finances of the museum will be put on a sound basis through the generosity of Chicago millionaires.

The museum is open to the public from 9 a. m. to 4, or until 6 p. m. in June, July, and August. On Saturdays and Sundays admission is

[a] Only 415 members in the city having a population of 1,700,000, while the museum of the Brooklyn Institute of Arts and Sciences has, as already mentioned, 6,000 members paying $5 each, in a population of 1,250,000, and the American Museum of Natural History in New York, with a population of 2,200,000, has 752 members paying $10 each.

[b] This is more than the yearly expenses for the entire 11 royal collections for arts and sciences in Dresden. In 1899–1900 the expenditures of the Columbian Museum reached $120,861.

[c] This is proportionately but very little, but 2,348 books or periodicals were received in exchange for museum publications.

free; on other days there is a charge of 25 cents for adults and for children 10 cents. The pupils of the elementary and secondary public schools always have free admission. Umbrellas and walking sticks must be left at the entrance and a fee of 5 cents is charged for checking. The annual average attendance for the past five years has been 250,000. In 1898–99 the number of visitors was 223,304; in 1899–1900, 266,899;[a] 21,447 and 28,110 of whom paid admission fees, and on the pay days there were also admitted free 9,714 and 15,216 during those years. On Saturdays there came 54,490 and 56,717, and on Sundays 137,653 and 166,856. The highest numbers on any single day were 6,709 and 6,839; and the minimum, in 1898–99, was 5. I am convinced that the number of visitors would be much greater if the museum were more accessible. From the central portion of the city, it takes an hour and a half by carriage, or half an hour by the electric or elevated roads, to reach the vicinity; or by rapid-transit road, running along the lake shore, ten minutes. For most visitors, however, it means a day's trip, for the city of Chicago covers 187 square miles.[b] Surely the number of museum visitors would also be increased if the entrance fee was abandoned. In 1898–99 the fees amounted to not more than one-twentieth of the entire budget, the average attendance on the 260 pay days being only 82 persons, while in 1899 and 1900 this average was 108 visitors for whom the entire apparatus of surveillance must be put in operation and the entire collection be submitted to the injurious influence of light. Thus it happens that a greater number of persons annually visit the incomparably smaller museum of the Academy of Sciences in Lincoln Park (see below), which allows free admission and is centrally located. In 1897 a patron of the museum endeavored to make it useful also for public instruction, and to excite the interest of youth, by offering forty prizes of from $5 to $50, amounting in all to about $300, to the pupils in the public schools of Illinois, for the best essay of 2,000 to 3,000 words, made without assistance, describing the museum or single portions of it. The result was "very satisfactory" and the attendance to the museum naturally increased.[c]

[a] The American Museum of Natural History in New York was visited in 1899 by 458,451 persons; in 1900 by 523,522 persons. (See also p. 330.)

[b] It has three streets that are each 25 miles long, or as far as from Dresden to Schandau. Berlin covers 36 square miles. From this, considering the approximately equal population—1,700,000—an idea can be obtained of the scattered arrangement of the greater part of Chicago. Dresden covers 18 square miles for a population of 500,000.

[c] See Publication No. 24, Report series, I, No. 3, p. 197 for 1897. Details of the results have not been published. There were about 70 essays handed in. The Carnegie Museum in Pittsburg, Pennsylvania, a new and very active institution, for which a great future is in store, has, since 1896, offered annually a prize competition, and has reported upon it in several publications which are of unusual interest, the last time in Publication No. 6 of the museum entitled "Prize essay contest, 1899, 32 pages, with 5

In March, April, October, and November, lectures are given on Saturdays, usually by foreign men of science, but also by the museum employees, for the most part illustrated by projections, for which purpose, in 1899–1900, 2,022 lantern slides were provided in the museum collections. Some of the employees of the museum, as the curators for botany, geology, and zoology, are at the same time teachers in the University of Chicago.

The publications, undertaken on a large scale, were begun in 1894. There are six series, the volumes being issued in parts or pamphlets: The annual reports, and series on anthropology, botany, geology, zoology, and ornithology. Up to the end of September, 1900, 8 volumes, comprising 50 single treatises, were almost completed, the greater part being zoological material. The museum also published in 1899 a quarto work of about 400 pages on the birds of eastern North America, by Charles B. Cory, with many hundreds of illustrations.

plates." It was open only to pupils of the secondary schools and the two sections (fourteenth and thirteenth grades) of the uppermost class of the Pittsburg grammar schools. The prizes were especially assigned for each class; 1 each for the fourth, third, second, and first year of the secondary schools and 1 each for the fourteenth and thirteenth grades of the grammar schools. (I refer to my remarks upon the American schools in the chapter on The University of Chicago.) There were awarded in 1899 thirty-eight prizes, ranging in value from $2 to $25, having a total value of about $250. The subject was "What I learned from five objects in the Carnegie Museum." The essay must not exceed 1,200 words, and 3½ weeks' time was allowed for writing it. The pupils were advised to obtain information about the museum from their parents and friends; they could also use books, and the teachers were specially directed to further the matter, but it was a point of honor that in the composition of the essay itself no help should be received. There were 401 essays handed in, of which 245 were by girls, who also, with but one exception, won the first prizes. The prize winners were from 12 to 21 years of age. The Indian groups were selected 173 times; the flamingos 120 times, the mummies 121 times, the camel group 86 times, the mastodon 64 times, etc. In all 220 different objects or groups of objects were treated. The boys inclined to choose themes which treated of war, sport, or business activity; the girls, those having historical significance and birds. In the above-cited publication the names of the competitors were published as well as the essay which won the first prize. This was by a young girl 18 years old, and was entitled "Fragments of Creation." She had treated of the following five subjects: The human skull, arm, and hand in the animal series, the gar pike, the Rosetta stone, and the meteorites. The introduction and conclusion as well as the transitions between the different parts were conceived in a religious spirit. In 1900 there were obtained for a similar prize competition 843 essays. (See W. J. Holland, The Carnegie Museum, in the *Popular Science Monthly*, LIX, 1901, p. 19.) Pittsburg had, in 1899, among 321,616 inhabitants, 46,266 school children, of which 1,823 were in the three secondary schools. As these essays came chiefly from the secondary schools their proportion to the 1,823 pupils was something enormous. In the three secondary schools there were 23 male teachers and 41 female teachers. In the 79 elementary schools there were 27 male teachers and 878 female teachers. The schools cost the city in 1899 $875,000. (Report concerning the public schools for 1897 to 1900, Pittsburg, 1900, 123 pages, with tables.) [These prize-essay contests were also continued in 1901 and 1902 with great success.]

A Guide appeared in 1900, in its sixth edition, 176 pages, with many plans; it could be made more useful to the visitor by indexes. From the sixth annual report, forming a volume of 512 pages, with 54 plates, together with the Guide and a little pamphlet entitled An Historical and Descriptive Account of the Field Columbian Museum, 90 pages, with illustrations and plans, a good idea can be obtained of the origin and condition of this great museum.

The library contains 24,000 volumes, and is excellently catalogued upon cards alphabetically and systematically arranged according to Dewey's system somewhat modified (see p. 399 of this paper). There is even a topical catalogue of the most important papers in scientific journals and in the publications of scientific societies—an unusual but very useful thing. The library also has a duplicate card catalogue of the John Crerar Library (see p. 451), with 23,000 titles, arranged alphabetically with its own cards—an excellent plan for the scientific worker in Chicago.

The catalogues of the collection are kept in the most scrupulous, careful, and exemplary order, for which purpose extra clerks are required. In the archives are preserved all the original documents of the collections, which are each provided with a permanent number, and receipts are always taken when these documents are delivered to one of the department employees. Besides, the registers are kept in books and on cards. Up to October, 1900, there were 94 volumes of the catalogue, with 215,000 entries, as well as 75,000 cards.[a]

The method of cataloguing, to which I paid especial attention in the anthropological department, is as follows:[b] Every newly acquired collection, immediately upon its arrival, is assigned a number and given an accession card. This card bears, in addition to a serial number, the name of the collector, the manner of acquisition of the collection by the museum, the place and date of the collection, the numbers assigned to the specimens, and a general statement of the nature of the collection. This card, together with any lists or correspondence that relate to the collection, is deposited in a stout envelope made for the purpose, which also bears the name of the accession. This envelope forms part of the historical file of the department. Both accession card and envelope, together with all correspondence, are made out in duplicate, one set being retained in the office of the curator, the other being sent to the recorder's office. Each object in the collection is then numbered to correspond with the number on a card which bears the name of the object, with a drawing of the same if deemed necessary, the tribe or locality whence the specimen came, the name of the collector,

[a] See the *American Anthropologist*, n. s., I, 1899, p. 473.

[b] In America everything, as one may say, is registered upon cardboard of definite size, and the catalogues are therefore called "card catalogues." This "card catalogue system" is exceedingly practical.

and, finally, the location of the specimen in the museum—whether it be on exhibition, and, if so, where, or whether it has been placed in the temporary or exchange storage room. The information contained on the cards is next transferred to the department inventory books under the appropriate numbers. Each card, as well as each entry in the inventory, also bears the accession number. The cards are then collectively filed in a card cabinet under the accession number, each group of cards being provided with an index card. The collection is finally indexed in a single large volume under the name of the collector, the locality, and the tribe. The advantages of this system are many and obvious. It can be determined at a glance what collections are in possession of the department from any locality or tribe in the world, as well as ascertained what collections the department may possess from any individual, as collector or donor or through purchase. From the accession number under any of these entries one can refer to the historical file for the lists or for the correspondence; or with the same accession number he may turn to the inventory book or to the card catalogue for a description or for the exact location of the specimens themselves. On the other hand, from the number of any given specimen, reference may be made at once to the inventory book for its locality or tribe; or, from the accession number there given, the correspondence in the historical file relating to the collection as a whole may be consulted. The method of cataloguing used in the botanical department is also very complete in its way; it is described in the Annual Report for 1899–1900, pages 440–442.

In such a complicated system there is naturally much clerical work necessary, but the expense of this is more than repaid by the saving of time which the excellent arrangement occasions. One can with the greatest ease obtain information concerning anything, and on the basis of its documents prepare exchange catalogues, of which already several extensive ones have appeared. In 1899–1900 the increase was 64,921 numbers in 286 entries; in 1898–99, 17,348 in 305; in 1897–98, 74,200 in 362.

The officials undertake many extensive collecting tours, the expenses of which are usually defrayed by patrons of the museum. When I was there in September, 1899, I met only a few of the museum staff. The curator of the zoological department was on the Pacific Ocean; that of the ornithological department, with his assistants and a preparator, were in Honolulu; the curator of the botanical department had that year made a voyage to the West Indies; the assistant curator of the zoological department had, among other collecting tours, made one to the Pacific coast; the curator of the anthropological department had made a tour to northwest America and other regions; and the assistant curator of paleontology had made explorations in Wyoming. In the year 1896 the curator of the zoological department had under-

taken a journey to Africa for the purpose of collecting specimens for the museum.

The labeling of the collection is carried on with the greatest energy, and everywhere one gets the impression of a museum well provided with descriptive and instructive labels, particularly well printed. The tendency to instruct the public in this respect is, in America generally, more marked than with us. The printing establishment of the museum prepared in 1898–99 over 7,000 labels, some very large, 3,500 of them for the anthropological department, and furnished also 95,000 other pieces of printed matter. In 1899–1900 nearly 8,000 labels were printed in the museum, 2,700 of which were for the zoological department, and there were also furnished 100,000 copies of other printed matter.

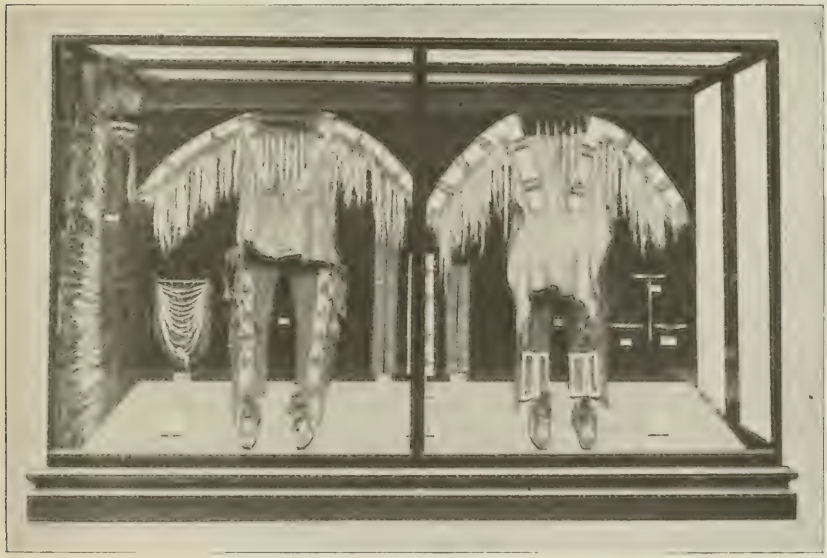


FIG. 34.—Field Columbian Museum. Case with movable partition.

The photographic establishment of the museum in 1898–99 prepared 548 negatives, 280 prints, 253 lantern slides, and other material; in 1899–1900 the corresponding figures were 1,148, 1,075, and 343.

The arrangement and installation of the entire museum gives, in general, a pleasing impression, especially in the geological and botanical departments, which offer many models, notwithstanding that in particular cases the methods and kinds of installation do not always come up to strict requirements. It should be remembered, however, that the whole work has been accomplished within a few years, and that some appliances already existing had to be accepted. There are, for instance, remaining from the exposition of 1893 many cases and desks with clumsy wooden frames and sides; but neither does the

recently procured furniture meet the rigorous requirements of to-day, notwithstanding pains have been taken to invent some new types of cases. In the ethnological section, for example, are seen large glass cases with wooden frames and clumsy supports, entirely destitute of doors, the sides being made of plate and the top of ground glass. One of the narrow sides of the frame can be unscrewed. The objects are now hung either directly or by supports on both sides of a movable partition provided with a foot piece, which is then shoved into the case. As these partitions are frequently not as high as the case itself, they do not look well. They can also be used as backs by shoving them in along the side (fig. 34). If an object must be changed, or is required for study, the great frame must be unscrewed with the aid of several persons. As a similar but much more elegant and entirely dust-proof case with iron framework and doors can now be furnished, the principle of the screwed frame that prevailed fifty or one hundred years ago can not be recommended.[a] I also give an illustration of the construction of the case top, with its disproportionately heavy woodwork in which, for stiffening, there is riveted an inset of wrought iron, half an inch thick and 4 inches wide, together with an illustration of the wooden partition (fig. 35). This partition is 11 feet long, 1½ inches thick, 5 feet high; its foot piece is 12 feet long, 1 foot 6 inches wide, 1 foot high.

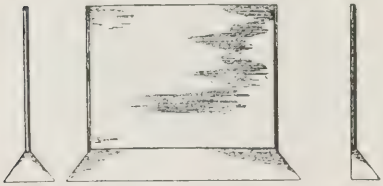


FIG. 35.—Field Columbian Museum. Top and partition of case shown in fig. 34.

The glass cases for the many large and often very remarkable and beautifully displayed zoological and ethnographical groups also have no doors, but nevertheless they have similar clumsy framework and bases. In the horizontal show cases the base has, indeed, the appearance of a closet, but the space is hollow and unused. Other types of glass cases in use in this museum are shown in figs. 36–37; fig. 36 is a neat style; the supports are of gas pipe of from three-eighths to a half inch in diameter, but the small panels of the top injure it; fig. 37 shows hanging shelves. Style fig. 38 is the hollow base and the inner

[a] If this is compared with what the curator of this department says concerning the cases in European museums (G. A. Dorsey, *American Anthropologist*, n. s., I, 1899, p. 471), one can only exclaim: *De gustibus non est disputandum!*

arrangement of a case or stand inclosed by glass doors and especially constructed for lighting from above; it is about 9 feet long, 1 foot broad, and 7 feet high, its base being 2 feet high; the woodwork is clumsy and the arrangement of the shelf supports, with four standards, is obstructive. Similar stands are used throughout the museum and do not generally add to its beauty; when, however, the exhibits do not need to be inspected on all sides, these stands are arranged as a four-sided well-lighted pyramid that excellently answers the purpose for which it is constructed. The new cases are of mahogany or of other wood polished black. In showing the collection of skeletons, black backgrounds are often employed, as in several European museums, but the setting of the skeletons contrasts disagreeably with this black background and their mounting is sometimes rude.

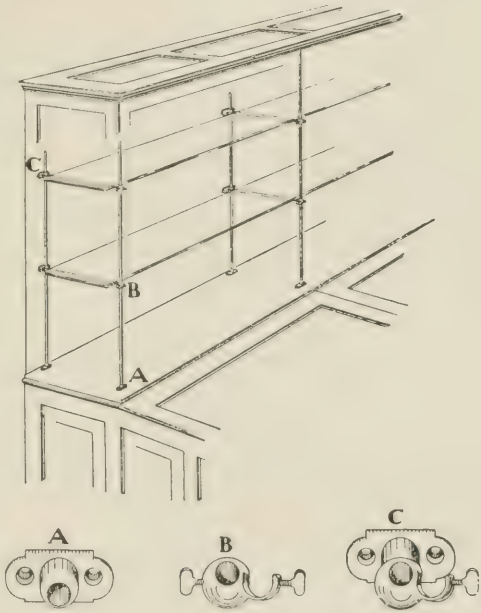


FIG. 36.—Field Columbian Museum. Types of cases and racks.

While some of the great mammal and bird groups are displayed in a strikingly beautiful manner, there were many of inferior character, for example, in the ornithological department, although the museum is developing so rapidly that perhaps even these may now have given place to better ones.

In the botanical department there were found very practical herbarium cases which showed a good utilization of space (fig. 39). They are nearly 7 feet high, 3 feet 4 inches wide, and have each 45 compartments, 5 inches high, and 3 sliding shelves. They stand in pairs, back to back, with sufficient intervening space for the doors to be pushed back out of the way. The doors slide on tracks, which also hold each pair of cases rigidly together. The door is hinged at *gg*, hung to the wing piece (*EE*), which slides to and fro with it on the track, and during this movement the door is always supported by a noiseless castor which is screwed into a block of hard wood, *h*, that serves as a check to the door when pushed back and as a foot press when locking it after closing. The door is opened as widely as the wing piece will allow and then shoved back. In closing, one pulls the key of the lock, the door is run along the track as far as the rolling pins *dd* permit,

and then swung shut. These cases offer many advantages and are ingeniously designed, but they should be made of iron instead of wood, for they would then be more secure against dust and fire. (See also Report for 1899 and 1900, p. 450, Plate XLVI.) This remark will apply likewise to the wooden cases of the entire museum. In this connection may be mentioned the pasteboard boxes still used, instead of tin, for the display of minerals and the like. I do not doubt but that the Field Columbian Museum will in time have recourse to iron cases, be it only as a security from fire, and that then excellent designs will be brought forth by the advanced technical skill of America.[a] Better cases are also to be desired on account of security against dust, for in the great halls of this palace, designed for a former exposition and all communicating with each other, the dust spreads unimpeded over everything and is very troublesome.

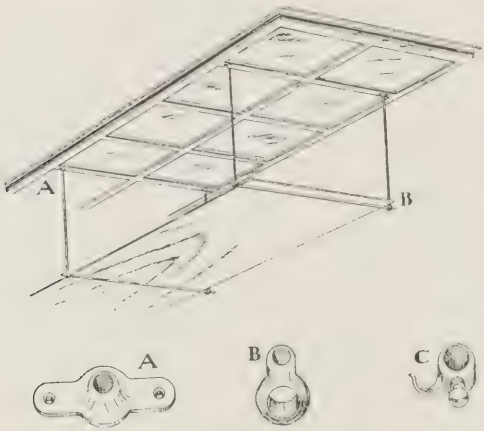


FIG. 37.—Field Columbian Museum. Types of cases and racks.

A collection of coins is suspended between glass plates—a very pretty method, but somewhat clumsily executed here.

The overcrowding of the exhibition space already mentioned is occasioned partly by the fact that far too much is exhibited. Objects must often be displayed because the donors demand it, and the result is that there are frequently hundreds of almost identical specimens, as in the ethnographic division, which are valuable for study but quite superfluous in a public collection, the more so as light fades them. Besides, by reducing the number of exhibits space could be found for workrooms, now quite insufficient throughout. There have been provided, as in the American Museum of Natural History in New York (see page 333 of the earlier portion of this paper), very practical, tight-closing tin boxes, with easily sliding compartments, for the preservation of

[a] From the criticism made by L. P. Gratacap in his article, The Making of a Museum, in the *Architectural Record*, IX, 1900, p. 393, on iron cases, both upright and horizontal, as "clumsy and ugly forms" (fig. 17), which are the only ones with which he is acquainted, one would not think the prospect of such a reform in America was very favorable. The honored curator of the mineralogical section of the American Museum of Natural History in New York, who has an interest in and knowledge of the technical side of museum administration possessed by few experts, would certainly change his view if he became aware of the better results in this line in Europe.

skins, plants, etc., 30 inches long, 20 inches high, and 18 inches deep, made by the American Can Company, Bowling Green Building, New York and Chicago, and costing $10. These are also made in various other dimensions. They often stand piled in the workrooms to the very ceiling.

In conclusion I will hastily sketch the museum collection, though from its great profusion I can give the reader but a feeble idea of its exhibits. I must limit myself to enumerating a few principal objects.

Anthropological department.—The archeology and ethnology of North America stand in the foreground. Among the most interesting, archeologically, is the collection of the Hopewell Mound group in Ohio, with a large series of copper, stone, and bone ornaments and implements, among which is a deposit of 8,000 stone implements. Well represented in a prehistoric way are Illinois, Arkansas, Wisconsin, Michigan, New Jersey, Tennessee, California, New Mexico, and Arizona. There is also a large collection of casts from the sculptures of Yucatan.

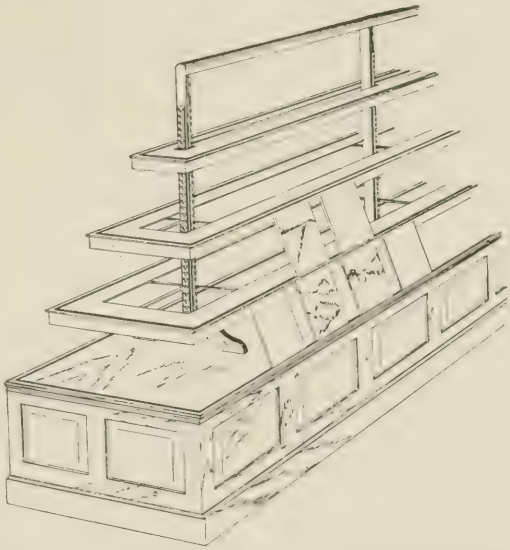


FIG. 38.—Field Columbian Museum. Types of cases and racks.

In the ethnological field there are very complete representations of the Kwakiutl and Bellacoola of the northwest coast, the Kulanapan of California, the Hopi of the Southwest, the Sioux and Algonkins of the Plains. I further mention houses, totem poles, and the other ethnographical equipment of the Haidas of Alaska, Eskimo materials from North Greenland, Alaska, and Eastern Siberia, group exhibits of the villages, houses, and industrial occupations of the Zuñi, Hopi,[a] etc., with life-size figures. One of the seven Hopi villages, Oraibi, in Arizona, is—so to speak—here reproduced complete, so as fully to show the interior and household life of the Indian of to-day. To this is added a collection of over 4,000 pieces of prehistoric pottery from the near-by Hopi ruins. Further, there are exact imitations of nine altars and sand mosaics as they are used in ceremonials of the Hopi, whose religious life is especially well represented.

[a] See also the detailed description of these Hopi collections in *Science*, n. s., XIII, 1901, pp. 219–222.

The ethnology of South America is illustrated by extensive collections from Colombia, Venezuela, British Guiana, and the region of the Gran Chaco; the prehistoric, by similar ones from Colombia, Ecuador, Peru, and Chile. Melanesia is the best represented in the South Sea division. Asia is at present represented from its eastern coast alone; the Korea collection is especially good; Java and Ceylon also offer some very notable objects used for theatrical and dramatic performances. Africa is represented only by special regions, such as the Congo basin and Portuguese Southwest Africa.[a] In European archeology there are shown many reproductions of the bronzes in the Naples Museum, as well as bronzes and wall decorations from Boscoreale and Grecian, Roman, Etruscan, and Phœnician originals. About a thousand objects from the Swiss lake dwellings are shown, and some also from prehistoric England. I can not, however, begin to enumerate all.

FIG. 39.—Field Columbian Museum. Herbarium case.

The section of transportation is given a prominent place, and one may say that no age and no land has been disregarded. It begins by showing how primitive peoples carry their children and their goods, shows all sorts of litters, pack animals, and other beasts of burden, carriages with solid and spoke wheels, and at last illustrates the entire development of the locomotive. It is impossible to touch upon every thing in a limited space. The peoples of America from Alaska to Brazil are especially well represented. So, also, the development of railway travel, shown with great completeness, is of historic interest. Serial cards indicate how the railways of America have increased every ten years. The water and wagon transportation is also shown in just as complete a manner. One may see a "Scythian" cart

[a] See also P. Ehrenreich's detailed description of this portion of the Museum in the *Zeitschrift für Ethnologie*, 1900, pp. 18–23, and G. A. Dorsey's paper, the Department of Anthropology of the Field Columbian Museum—a Review of Six Years, *American Anthropologist*, n. s., II, 1900, pp. 247–265.

(replica), a Nile boat of the fifth century B. C., an Etruscan boat as a child's plaything (replica), the caravels of Columbus, and a Viking's ship.

The physico-anthropological collection is very notable, and is among the best in the world. It must be the richest in human skeletons, although only in American ones. I did not get the exact number of skulls and skeletons, but there must be several thousand. Many hundreds of skulls and skeletons are from the tribes of the northwest coast, the Blackfoot, Algonkin, and allied Indians, from the mounds in Ohio and the prehistoric graves in New Jersey. The Flatheads of the Columbia River are represented by a series of complete skeletons, with 100 artificially deformed skulls; Peru with over 150 complete skeletons and many skulls. There are also 90 skulls from New Guinea, some Maoris, and a small series from many regions of the earth. An instructive exhibition is made in 33 cases of selected pieces from the large collection. There is one case devoted to each of the following: Craniometric nomenclature, sexual variation in the skeleton, variation in the cranial sutures; varieties at the glabella, pterion, and in the orbits; variation in the nasal region and degrees of prognathism; variations in the intermaxillary suture, mastoid process, shape of palate, and direction of palatine sutures; variations in the lower jaw, lachrymal bones, and occipital condyles, the clavicle and scapula, the dentition, the sternum and bones of the pelvis, the humerus and the tibia, the femur; skulls of different capacity and various cephalic indices; skulls showing variations in the orbital, nasal, and dental indices; in the facial, palatal, and bizygo-stephanic indices; variations in the scapula, lumbar, sacral, and pelvic indices; pathological skulls, artificially deformed skulls, trephined skulls from Peru. Six cases are devoted to disarticulated skeletons showing pathological or anomalous characters; one to models of the brain; one to casts of cranial cavities, including those of animals; two to skeletons of gorillas and men of various races; two to the chemical constituents of the human body; one to life masks of the races of eastern Asia and of Oceania. There is added to this an anthropometric laboratory, with the needful instruments. This department was specially organized by Dr. Franz Boas, a German, now at the American Museum, in New York, and professor in Columbia University. I have described the physico-anthropological collection with more relative fullness because a similar one can hardly be found elsewhere, and it may perhaps lead to imitations. The present competent curator of this department, after a visit to European museums, expressed the opinion that as to the exhibit of physical anthropology none of them could compare with the Field Columbian Museum in Chicago,[a] wherein I agree with him.

[a] G. A. Dorsey: *American Anthropologist*, n. s., I, 1899, p. 463.

Botanical department.—There was obtained from the World's Fair, beautifully installed both in geographic sequence and in a monographic manner, an unusually extensive collection of woods, forest products, such as fruits, resins and the like, fibers, and other economical plant products, in a profusion that is, perhaps, without a parallel. Especial attention is given to products having a domestic and practical value, such as cotton, tobacco, hemp, grains, tea, coffee, spices, dyestuffs, etc. Forestry is illustrated by monographic exhibits. From one and the same tree there are shown blocks, leaf-bearing branches, and flowers; photographs of the species at various ages; pieces of its bark, cross sections of the stem, planks in various stages of working up to a polished condition; besides a colored chart of the geographic distribution of the species, statistical data concerning its weight, hardness, density, and heating value, so that any one, from his own standpoint, may obtain information and instruction. In this way "Latin" America is especially well represented, and there are economical botanical products from Russia, Japan, Korea, Ceylon, British India, Johore, North America, Mexico, Guatemala, Jamaica, British Guiana, Venezuela, Colombia, Ecuador, Brazil, Paraguay, and the Argentine Republic. Recently there has been installed a complete collection of the timber trees of North America. The herbarium contained, in October, 1900, about 80,000 plants, and is, like the whole vast department, especially well organized. Particular attention is paid to American plants, and the collection is rich in North American and West Indian species.

Geological department.—The collections are arranged in two series—one systematic, the other economic. The systematic is divided, as is usual, into paleontological, mineralogical, lithological, structural and dynamical sections. The paleontological section is chronologically, and within each period zoologically arranged. Much attention is given to the collecting of fossil vertebrates of the western United States, a region specially rich in this regard. I will name, as an example, the material obtained in South Dakota in 1898 relating to *Titanotherium ingens* Marsh, a mammal resembling a rhinoceros and nearly 16 feet long, and the extensive material collected in 1899 in Wyoming relating to land reptiles (dinosaurs) known as *Brontosaurus*, *Creosaurus*, *Camptosaurus*, *Morosaurus*, etc., the last named having a femur over 5 feet long.[a] The mineralogical section is arranged according to Dana. In the section of structural and dynamical geology there are shown, among other things, cave products (stalactites, stalagmites, and the like), in a great cave naturally arranged. The economic series illustrates the occurrence of minerals and ores which have economic importance, the processes by which they are extracted, and their application in the

[a] Recently there have come to the Columbian Museum dinosaur remains of yet larger animals, among which is a femur over 6 feet 6 inches in length. (See E. S. Riggs, in *Science*, April 5, 1901, p. 549.)

arts and industries. These economic collections are arranged in systematic series with geographic subdivisions. Because of the profusion of this material I can only mention a small part: Comprehensive exhibits of combustible minerals of the United States according to their occurrence, their composition, their economic value, etc.; the building and ornamental stones of the United States; the kinds of marble and such like, also those of many European countries (in cases like fig. 38); the metallurgy of the precious and base metals, the metallurgical process being represented by groups, in which pieces of the ore, the smelted product, and the combustible materials used are displayed with the help of labels and converging and diverging lines showing what materials go into the furnace and the resulting products, with all the intermediate stages; their composition, peculiarities, uses, etc., are given in printed descriptions, so that anyone seeking information can get all the necessary data at once. A striking collection of precious and decorative stones, and a collection of meteorites which fills an entire room, are conspicuous.

The vast and copious collection of this department is remarkable for its instructive and often elegant installation. I would have been glad to include illustrations of entire rooms like those shown in the annual reports of the museum. I should certainly not neglect to mention the model of the moon, 18 feet in diameter.

Zoological and ornithological department.—The most striking feature of this department is, first of all, the excellent representation in large glass cases of groups of animals, such as orang-outangs, chimpanzees, nose apes, musk oxen, black sheep from Alaska, gazelles, antelopes, leopards, hyenas, herons, etc. Sometimes the secondary work of artificial foliage and the like is somewhat obtrusive, but these groups excellently fulfill their object of attracting the general public, though they also require much space. The systematic collection has not yet received the same consideration, for the proper preparation and installation of a large series of animals can not be accomplished in a short time. The skeletons stand in a room adjacent to the systematic collection. About 10,000 species of shells are shown in horizontal cases of not especially pleasing construction.

The Field Columbian Museum would do well to somewhat contract its programme and lop off several branches which have led it too far in its attempt to embrace all possible lines of human interest, so that it may devote itself in a scientific way to the natural sciences and to ethnography still more than it does now. There is still clinging to it too much unimportant material from the World's Fair, but one can only look with real admiration at this museum, which has sprung out of the earth in so short a time. If it secures, as is expected, a new building, I do not doubt but that it will astonish the world by its ability and compete with the first museums for precedence.

10. CHICAGO ACADEMY OF SCIENCES.

In the year 1857 an association "to promote science" was organized under the name of "The Chicago Academy of Natural Sciences." It began at once to make collections, but the commercial crisis of that year was unfavorable to the development of the enterprise.

In 1859 and 1865 the association was incorporated under the name "The Chicago Academy of Sciences." Encouraged personally by L. Agassiz, they laid in 1863 the foundation of a scientific museum, which was deposited in a house near the present city hall. The collections were enlarged with the help of expeditions, but in 1866 some of them were destroyed by fire, after which accident the academy began the construction of a fireproof building 50 feet long 55 feet wide, and 50 feet high, not far from the present Auditorium.

In 1868 the first meeting was held in the new building, which was of brick, the floors of iron and tiles, the stairs and main doors of iron, and the windows with iron shutters. The museum was in the upper story, 28 feet high, a large space with broad galleries, and was soon filled with precious collections, including 10,000 glasses with crustaceans and 8,000 species of marine shells, and the library was also largely increased.

In 1871, at the great conflagration, however, everything was destroyed, although at the beginning of the fire they had trusted in the supposed security of the building, but not the least thing was left of the collections. Not more than twelve days after this disaster it was decided to erect a new building on the same spot. In that building the first meeting was held in 1873, but in consequence of pecuniary difficulties the academy was obliged to leave these quarters in 1886 and store its collections.

In 1891 a plan was considered of associating with the new University of Chicago, but the members preferred not to sacrifice their independence, and when a rich citizen, M. Laflin, offered to spend $75,000, and the Lincoln Park board offered a space and $25,000 for a new building, the architects, Normand S. Patton and Reynolds Fisher, of Chicago (now the firm Patton, Fisher & Miller), were charged with making the plans. They designed a building of 750 feet frontage and a dome 130 feet high, of which plan, however, only the northern-side building could be executed (Plate 16). It lies isolated in Lincoln Park, in the northern part of the city, at the lake near the zoological garden and the hothouses of the park, and called after its patron, who died in 1897, the "Matthew Laflin Memorial Building." The museum was opened to the public in 1894. This wing (part) is 133 feet long, 61 feet wide, and 70 feet high, and is fireproof. The wooden floors are laid on cement; the cases, desks, and other furniture, the doors and sash are of wood. With respect to the fireproof construction I

CHICAGO ACADEMY OF SCIENCES.

Completed portion.

received the following information from Mr. Patton, whose acquaintance I had made at the Union League Club of Chicago:

As to the materials of construction, the iron columns are covered with porous terra cotta and finished by plastering with Keene's cement upon the terra cotta. The fireproofing of the building in general is effected by application of hollow tile known under the name of "soft tile," or "porous terra cotta." They are prepared of a mixture of clay with sawdust in the kiln. The sawdust is destroyed and the clay becomes porous or spongy by this process.

The floor arches are of 6 by 6 inch tile, segmental in form, and of about 11 feet span, and resting upon iron beams which run from the outside piers to the corresponding columns of the interior.

The plaster is laid directly upon the under side of the tile arches, so that the ceilings consist of a row of arches.

The roof is constructed of iron supports which, like rafters, run up and down the slope at intervals of about 5 feet. On the upper side of these rafters T supports, 2½ inches broad and of the same height, are laid horizontally at intervals of 2 feet, upon which rest hollow tiles that have the form of books and therefore are called book tile. The book tile form a continuous surface upon which the roof tiles are laid. First the book tile are covered with a waterproof mass and then the so-called "Spanish style" of roofing is applied, where the roof tiles are nailed directly down upon the book tile that let the nails enter easily and also hold them firmly, as they are of porous clay. All parts of the iron frame of the roof are made fireproof by a cover of plastered hollow tile; there is no uncovered metal in the whole building. The security against fire of the vaulted ceiling over the central hall of the museum is effected in the following way: This ceiling is made of a steel frame covered by expanded metal lath, and plastered from below with hard cement mortar. After this plaster has become hard, the exterior (upper) side was plastered the same way, so that the ceiling consisted of a solid mass of plaster about 2 inches thick, in the midst of which the expanded metal is embedded. Thereby it was made so solid that a person could walk on it.

The interior walls of the building are covered with vertical wooden furring 16 inches apart; this is covered with expanded metal lath that is plastered. Here the wooden furring would not allow a fire to spread, because it is inclosed in front by the plaster, on the back by the brick wall, and above and below by the fireproof ceiling.

The staircases are of iron.

In many buildings columns are treated as disagreeable necessities, which are spaced as far apart as possible with little regard to anything except to make them inconspicuous. In this building the columns are treated as the most important feature in the interior architecture. The design of the building proceeded from the interior outward. In the first place, it was determined what should be the proper dimensions of the cases in which exhibits are to be placed. It was found that 3½ feet was the most economical and effective width for the double cases, and that 6½ feet between the cases gives an ample width of alcove; therefore it was arranged so that there should be a case against each pier, and the piers are to be placed 10 feet on centers, and the columns are to be exactly opposite the piers. To this arrangement the exhibition cases fitting in between the columns and the piers on the outside walls, form a part of the architecture of the building; and the windows coming, in every case, in the alcoves between the cases give a most perfect lighting to the specimens. This arrangement of columns will give to the interior an effect of size much greater than reality, and will prevent that appearance of emptiness which museum buildings are apt to have.

As we predict that the exterior of the building will be a prominent landmark in Chicago's architecture, we venture the assertion that the interior, small though it be,

will attract much attention from those interested in museums. There are many museums which appear to have been erected on the theory that they were simply storage warehouses for the safe-keeping of specimens. This building is designed on the theory that a museum is a place for the effective display of specimens; in which case it is important to bear in mind that bare white walls and mean architectural surroundings will belittle the value of whatever is contained therein; while a rich architectural setting will give to the public a true impression of the value of the collections displayed for their benefit. [a]

The plan of this finished wing is one of the best that I ever have seen in a museum, and it is to be regretted that only such a small part of the whole could be executed. The construction was developed from within, since the most perfect use of space was based upon those dimensions of the cases and the space between them that are considered the very best, and not until then were the interior and exterior architecture fitted to these demands. Therefore, as can be seen in the plans of the first floor and part of the second or gallery floor, figs. 40, 41, the cases all around stand exactly between the columns and the piers between the windows, and they all receive their light from the side except two of them, that could just as well have been placed in some other position. This is, I believe, the most correct principle, but the dimensions, without exception, have all been made too small; from this fact, besides some others, the people crowd too much in the spaces between the cases. But this only happened because the means were so limited that the architects were compelled to use minimum measures. Otherwise they would have built on broader plans.

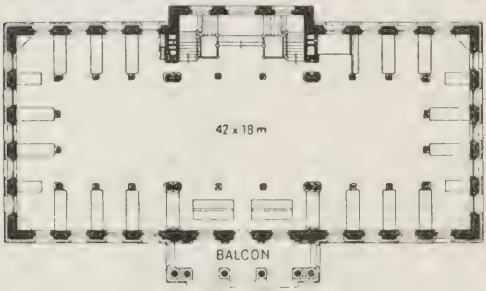


FIG. 40.—Chicago Academy of Sciences. Plan of first floor.

The building has the following horizontal divisions (fig. 42):

1. A high basement for laboratory work, packing, heating, storerooms, etc., and a dark chamber, partly cemented and furnished most practically.

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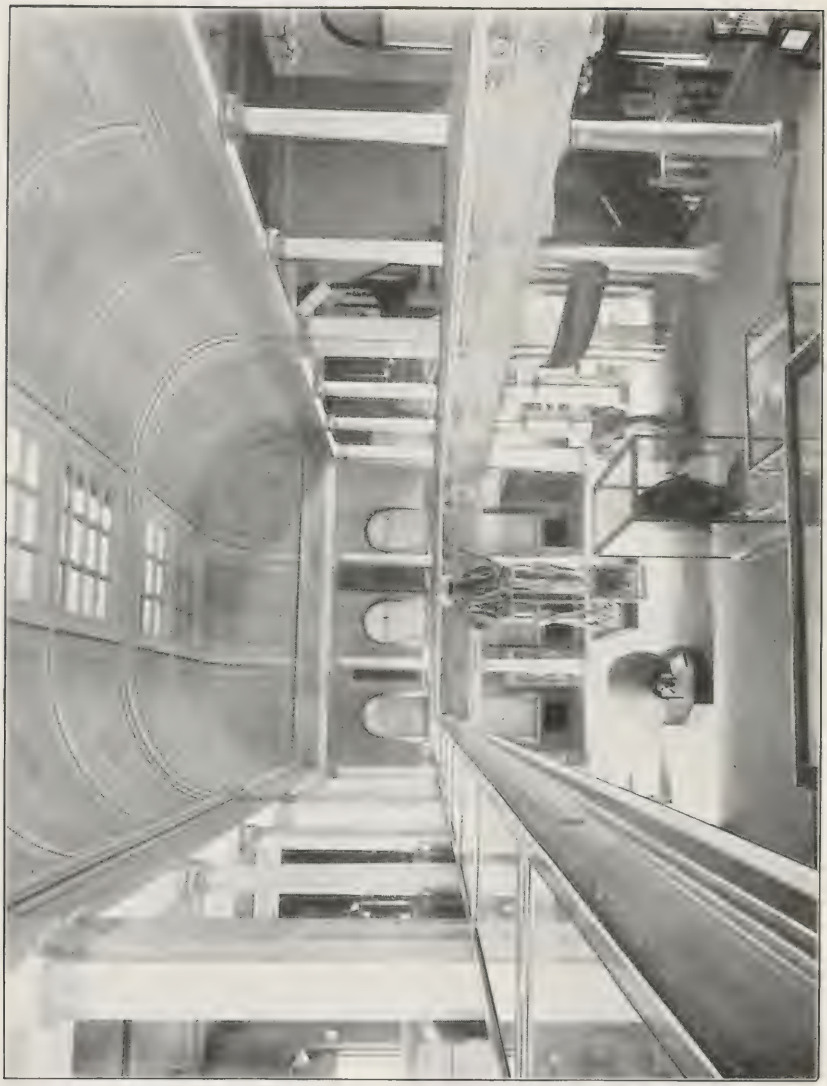
[a] Mr. Patton quite recently, 1903, wrote me in respect to these remarks:

It is a matter of no small satisfaction that my prophecy should come true only ten years later, and that your description would recognize the scientific method which had been applied to the planning of this building. I realize that the dimensions are all minimum, and should be increased, if possible, for any building likely to have such large crowds as visit this building, but when visiting New York City I was struck with the enormous waste of floor area from the lack of attention given to the spacing of the windows, so that comparatively few exhibits could be placed in a given space, and my object was to give the maximum capacity consistent with proper lighting and access.



CHICAGO ACADEMY OF SCIENCES.
Main floor.

2. First floor with entrance hall, that is used for exhibition purposes (in the middle a large group of flamingoes), library, herbarium, besides a lecture room (with book shelves at the sides), offices and rooms for the park board.

3. Second or main floor which, together with the third floor, forms a large hall with light from above (Plate 17). This hall has in its center a room for large animals (mammoth, glyptodon, gorilla, bison, muskox, American elk, groups of lions, etc.); in the cases all around, the vertebrates; also some ethnographical specimens.

4. Third floor or gallery: All around the railings of the gallery are horizontal cases for insects (in the illustration, Plate 17, are seen some other objects in these cases, the pictures having been taken some years ago); in the cases at the window sides are mollusks and lower animals, paleontology, geology, and mineralogy.

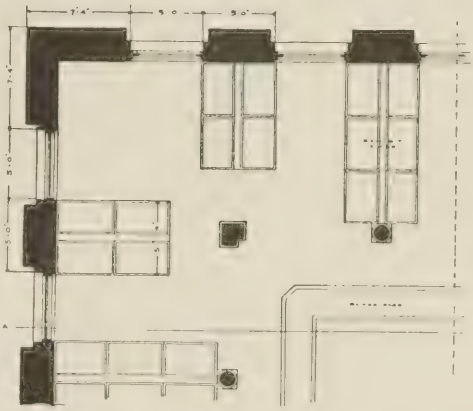


FIG. 41.—Chicago Academy of Sciences. Plan of second or gallery floor (in part).

5. The attic, which runs all around the vaulted ceiling with skylight, perfectly illuminated, and at the outside walls of which stand storage cases with birds, shells, lower animals, fossils, and minerals; this attic is perfectly fireproof, which fact I especially emphasize, as this is rarely the case in Germany.

It would be difficult to devise a better and more practical use of space. Beside the stairs an elevator runs from the basement to the gallery.

Adopting a combination of ceiling and side light (if for any reasons the first one had to be employed too), the main advantage of the building lies in its being exceedingly well lighted.

The height and width of the windows and the walls between are so excellently arranged that the light flows through all the rooms, and the effect of the ceiling light, which is relatively small, could almost be spared. Besides the reflection of the horizontal cases at the gallery railing, which as everywhere with ceiling lights is very annoying, is diminished by the light flowing abundantly in from all sides. I know a number of similarly built museums, but they either use only or almost entirely the ceiling lights, which arrangement has many disadvantages, or the side light is not made use of either so profitably or so completely.

The wooden cases and desks with their sharp yellow wood color are

not up to very strict requirements, but everything was done to make them dust tight, as far as wood will allow it. Some of the larger cases have no doors on hinges, but the frames are tightly screwed on, which fact I have mentioned above at the Field Museum as entirely anti-

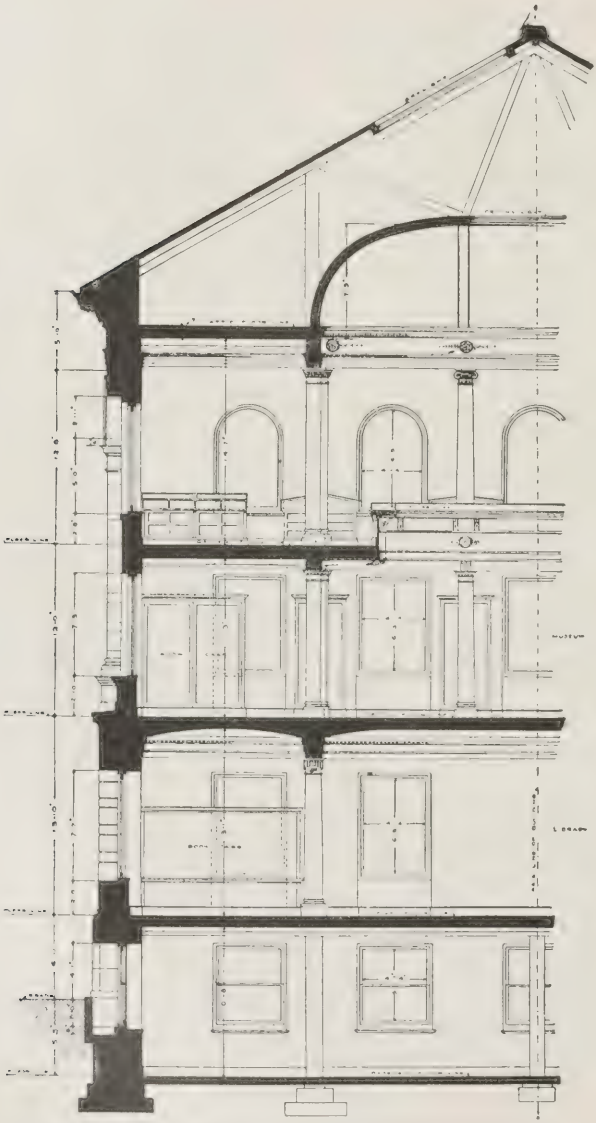


FIG. 42.—Chicago Academy of Sciences. Cross section along the line A B shown in fig. 41.

quated and not very recommendable. Since the building in other respects is totally fireproof, and after the sad experience of the two conflagrations, it would certainly have been more advisable to use iron furniture instead of wooden.

Since, as we said above, the dimensions of the cases have without exception been proportioned to the dimensions of the entire building, and as I believe this to be the only correct view in buildings of this kind, I shall dwell upon this point a little more explicitly. Generally the architect plans a museum without considering the consequences that are connected with the breadth of the windows and the spaces between, nor does he regard the proper length and depth of the cases. Very often the officers of the museum do not support him sufficiently, since most of them do not care for these specialties; besides, the architect generally does not ask their advice at all. In this way most museum structures are erected schematically, and then the dimensions of the cases must be arranged according to the dimensions of the building, instead of vice versa. In such cases it very often happens that the show cases are set up without consideration of the existing distribution of light. Examples are odious, but it would really be hard to mention a museum at the erection of which the proceedings were as judicious as at the erection of the Academy of Sciences in Chicago, although the dimensions were necessarily too small on account of insufficient funds.

After mature deliberation, the architect had decided for cases of 3½ feet depth, and a minimum free space between them of 6½ feet. This gave a result of 10 feet minimum as the distance between the centers of the piers, and a breadth of 5 feet for the windows. The free spaces in the central portion and at the corners are more liberal in size. In the gallery the depth of the somewhat low cases is almost exactly equal to the breadth of the walls between the windows, as seen from fig. 41, and, according to my opinion, is the most suitable proportion. Although in this instance the intervals are very narrow, the typical length of the cases, which was varied only now and then, was determined at 10 feet 10 inches, with a breadth of 3 feet 6 inches, and a height of 7 feet 7 inches, with one door 3 feet 2 inches in breadth and 6 feet in height, having one plate of glass for each of the three divisions of the length. I do not want to criticise these dimensions, but mention them only to show how considerately the architects proceeded, and how much one dimension depends upon the other, if once established.

According to need, a partition and shelves are put into the cases, and I only have to say that the shelf brackets are adjustable, so that horizontal or slanting shelves may be used; there are also arrangements made to separate the case divisions from each other by partitions, according to the doors. Therefore, all the cases, as well as their interior arrangements, can easily be interchanged. All these things seem very simple and self evident, but such a care for details we find but rarely, if ever, among our museum of architects.

The length of the cases determined exactly the position of the iron

columns that run through from the basement to the top and are, as we have said, fireproof covered. They all stand (see fig. 40) at the interior side of the cases. This also seems to be simple, natural and evident, but only look at the museums in regard to this point! At the American Museum of Natural History in New York City, that modern, magnificent edifice, the front was constructed without taking into consideration the dimensions of the cases—a mistake that, as stated above, is made almost everywhere and the columns inside in the halls do not correspond with the piers between the windows, so that the columns and the show cases come into conflict with each other. With how many museums is this the case! In the Academy of Science of Chicago the cases determine the interior architectual divisions, and this is the only correct principle. In the same way, the gallery railing, with its desk cases, is organically connected with the architecture, not attached externally, as we so often find.

I again emphasize my opinion that I do not consider the chosen dimensions to be the most happy ones, although they were directed by the narrow space available. I only tried to show the rational principle that was hereby followed and was worthy of imitation. The building, situated in a very much frequented public park at one of the greater traffic streets, must be built to offer a pleasant view externally, and therein the architects were very successful with a modern French Renaissance style. For the same reason the front must be made of a good material (limestone), and as the means were not sufficient to make it longer, the height was necessarily proportioned to the dimensions of the available ground, and consequently the height of the single stories had to be reduced to a minimum measure, or else it would have been too uniformly square. If the architects had not thus been hindered their intellectual planning would have produced still better results.

Since the distribution of light is so very excellent in the building, I think it to be an advantage to mention the height of the single stories and the situation and size of the windows.

	Ft.	in.
Basement in clear	10	6
Height of window	5	0
Height of sill	3	6
First story in clear	12	6
Height of window	7	0
Height of sill	2	9
Second story in clear to gallery	11	0
Height of window	6	6
Height of sill	3	3
Gallery in clear	14	0
Height of window	7	0
Height of sill	2	9

The vertical height in clear of the middle ceiling light is 34 inches.

The space under the horizontal cases is provided with cases with drawers for scientific collections; it is not hollow and covered in, as at the Field Columbian Museum. The arrangemnt with interchangeable drawers is good. Excellent order exists everywhere.

Great care is applied to the art of taxidermy, but some of the older specimens are not ornamental to the museum.

The labeling is with instructive descriptions printed at the museum, and the work is executed in general with the greatest care and a great deal of pains, as shown in fig. 43, the interior of the case of fossils. In the drawers the objects lie loose in cardboard boxes, and in the exhibit collections they rest upon labels of cardboard with paper pasted on, therefore there is no permanent arrangement such as could be attained with thin metal plate; but the strength of the cardboard and the color of the paper are selected after much experimenting, and the appearance of the tablets is excellent, at least for the present.

FIG. 43.—Chicago Academy of Sciences. Case showing fossils.

But in time the cardboards warp and the cream color fades, for the museum is open to the public daily from 9 a. m. to 5 p. m. (on Sunday from 1 to 5 p. m.), and the collections are so long exposed to the light that they must become injured sooner than necessary. The labels are 3, 6, and 8½ inches long, and 2, 4, 6, and 8½ inches wide, not to mention extra sizes. They are either printed directly on the cardboard or on paper of the same color, and pasted on the board. The printing types are especially attractive. The paper used is called "star manila;" the cardboard is a seventh of an inch thick, with a border of black gummed paper, and covered with the manila paper so that a black rim remains. If a black background is required for the objects, the yellowish paper is again covered with black paper, as on paper boxes. The whole arrangement is neat, and you rarely find so much care taken in other museums.

According to European custom, the name "Academy of Science" is rather misleading, for an academy of science in Germany means an

institution comprising all branches of letters and science, while the Chicago institute is an association that has for its object "to improve and propagate scientific knowledge by lectures and publication of original essays, by a library and museum, as well as by such measures as are adapted to awaken interest and promote scientific research." In this quotation the words "scientific" and "science" mean almost exclusively natural science. In former times Americans used high-sounding titles everywhere, as in hundreds of lower-grade schools that called themselves "universities," and the "Academy of Science in Chicago" thus bears an improper title that was accepted in 1857. I think the correct name would be "Natural History Society of Chicago," and so it should be changed. The academy is divided in six divisions: Astronomy and mathematics, photography, chemistry, geology, entomology, and biology. The association has ordinary and extraordinary members, who pay a fee of $5 a year (the ordinary also pay an entrance fee of $10); life members, who pay a single fee of $500, and patrons, who pay $2,500 at one time. It also has honorary and corresponding members. The board consists of a president, a vice-president, a secretary, and a treasurer, with ten trustees, among them the president of the Lincoln Park board. Only eight persons receive salaries—a curator, the secretary, a preparator, a clerk, a supervisor, three janitors, which, even for this small museum, is an unsatisfactory number of officers. With the supervision of the building during the time visitors are admitted, only two persons are charged; the public, in general, controls itself. The curator of the museum, a professional man, is in all his plans dependent upon the decisions of the trustees, who are nonprofessionals; a fact that is not very favorable to the progress of the museum. This kind of obstacle does not exist to such a degree in Germany, unless it be in certain "purchase commissions." The impairing influences, however, are even here not wanting, but lie more in those who have to do with assigning the moneys, and who are less appreciative of the educational value of the museum, and thus, as is the case in America, they economize at the wrong end.

The annual revenues of the academy are $5,000 from the Lincoln Park administration, spent for salaries, and the fees of the members, amounting to $1,500, spent for administrative expenses. The park board also pays for heating, illumination, cleaning, and repairs of the building, and pays the three janitors. If more money is needed for administrative or for purchasing purposes, or for expeditions, etc., appeal is made to the liberality of the members or the public, and always successfully, though until now in very modest limits compared with other similar institutions in America. In 1900, $8,000 was expended.

A special division with its own publications, the Natural History Survey of Chicago and environs or vicinity, was established in 1892.

The academy issues Transactions (two vols. in quarto, with 35 plates, 1867–1870), Bulletins (two octavo volumes since 1883), Annual Reports (1895–1897), Catalogues for exchange, and Bulletins of the Natural History Survey (formerly Geological and Natural History Survey), four of which were issued and several others are in preparation. These publications are treatises especially on the branches of paleontology, zoology, and botany of the country. The library is almost exclusively augmented by exchanging the above publications, the publications of more than 200 other institutions, and contains 10,000 volumes and several thousand pamphlets.

The meetings of the academy in which scientific lectures are given take place monthly, and besides these, weekly popular scientific lectures are given during the winter season. In 1900 twenty-five such lectures took place and were patronized by 7,000 persons. The lecture hall holds about 300 persons.

The museum had 300,000 visitors in 1900, from 25 to 5,000 daily.

The increase in the collections amounted to 7,600 specimens in 1900, 1,000 of which were by exchange. The entire number of specimens was 150,000, among them 75,000 mollusks, 30,000 arthropodes, paleontological and botanical objects, 15,000 each, 5,000 mineralogical objects, and 4,000 birds.

The museum of the Chicago Academy of Science will certainly develop itself from these existing beginnings, for it contains even now many original and suitable features, and the building itself must be considered as a model of a smaller museum building. On account of the careful planning of the whole, and especially on account of the practical views the architects so preeminently followed, it would be greeted with the greatest satisfaction if the rich citizens of Chicago who patronize museum interests would at this time not only favor the Field Columbian Museum and the Art Institute, but also help the academy to such a success as it deserves by reason of its modest yet praiseworthy accomplishments, compared with other great American institutes. A city like Chicago, with its extensive area, should not only have two great museums for natural science, but they are really a necessity. Therefore a "crescat, floreat" is certainly in its place.

II. CHICAGO HISTORICAL SOCIETY.

The Chicago Historical Society was founded in 1856, and in 1857 incorporated by the State of Illinois. Its object is to institute and encourage historical inquiry, to collect and preserve the materials of history, and to spread historical information, especially with regard to the Northwestern States. In 1868 it occupied its own building, whose construction had cost $60,000, but the great Chicago fire in 1871 wholly destroyed it, together with the entire collection of over 100,000

objects, books, etc., having a total value of $100,000. In 1872 the society was reorganized, but in 1874 a second time lost its collections by fire. In 1877 it was organized anew and soon installed in a temporary building. Its present structure at 142 Dearborn avenue, not very far from the Academy of Sciences (see p. 430) and the Newberry Library (see p. 459), was begun in 1892 and the society moved into it in 1896. It was designed by Henry Ives Cobb, architect of the Newberry Library and of the University of Chicago, in a Romanesque style, and cost $190,000, which was contributed by the members. Unfortunately a ground plan of it could not be obtained. The collection contains pictures, including 75 portraits in oil, manuscripts, historical reminiscences of Chicago and the Northwest, prehistoric objects, together with a library of 26,000 volumes and 60,000 pamphlets, relating chiefly to historical matters. This library is placed in the back part of the second story, where the high windows are seen in Plate 18. The museum is in rooms on the ground floor and on the second floor. In the right wing in the illustration is a large and lofty lecture hall. All of the rooms are particularly well lighted.

What makes this structure uncommonly interesting and wherein it is unique, as far as I am aware, is the fact that, made wise by two grievous disasters, an absolutely fireproof building has been produced, in which the use of wood has been entirely avoided. All is of stone, brick, cement, and the like—iron and glass. The only combustible things that I saw there, besides the books, papers, and collections, were the curtains and carpets in the auditorium. The entire structure consists almost wholly of large intercommunicating rooms, each of which can be closed off by iron doors, so that it forms a "safe" by itself. The city furnishes the electric light. It is heated by natural gas brought from a distance of over 150 miles. The large, open, heating rooms in the basement, besides, are entirely isolated. Window frames, doors, stairways, book stacks, show desks, and similar structures are made of iron and stone, as are also all utensils and furniture, such as writing desks, tables, chairs, and the like. The shelves to the iron book stacks are stone slabs. The neighboring houses, some of which are very high, as will be seen from Plate 18, can, on this account, hardly be considered as a danger, although one would be glad to see them farther away.

The right conception here shown of a secure building seems to me well worthy of imitation, for I am of the opinion that in this way, and no other, should museums and libraries be built and furnished. What, indeed, hinders this, except the prejudice which exists in many quarters (even in Chicago, as we shall see in the Newberry Library) against iron, except the designs of those architects who continually build from the same "ready-made" plans, formal and without originality, and except the lack of proper qualifications in those to whom museum

CHICAGO HISTORICAL SOCIETY.

interests are intrusted? Ever since the year 1878, when I became acquainted with the Royal Library in Stockholm, which stands isolated upon a spacious plaza and is a fireproof building of stone and iron, I have advocated this principle for museum buildings, but for the first time in the building of the Chicago Historical Society I found my idea absolutely carried out, for even in Stockholm they have not proceeded with such thoroughness.

In the ironwork itself the historical museum does not excel. The iron is not adequately treated, it rusts at the window frames, under the tables, etc., because the proper materials were not used in painting and varnishing.[a] Besides, the iron furniture is clumsy and often over ornamented, although now, at least in America, iron furniture is produced of ornamental and tasteful design (as already mentioned, p. 380), whose external appearance exactly simulates wood. Just as clumsy are the iron show desks, provided as they are with a primitive arrangement for raising the lid that allows the dust to sift in. Upright cases are not used. The iron book stacks, too, do not show the neatness usually seen in such work in America (see pp. 371, 382, 399 of this paper), and as I shall describe hereafter, in the Public Library of Chicago. Book shelves of sheet iron would be preferable to those of heavy stone, which look clumsy.

In spite of these criticisms I can only again urge that the general arrangement is in principle entirely correct, in execution excellent, failing only in a slight degree to meet rigorous requirements, so that as a whole it is to be most earnestly recommended to all museums for imitation. In my eyes, at least, the Historical Society of Chicago has performed a great service in that it has carried out the idea and especially that it has created a model. There is at present no published description of the structure, but one is contemplated.

Since 1882 there have appeared four octavo volumes of Collections besides Proceedings and Annual Reports.[b] There are four regular sittings during the year.

The society has life members (32 during 1894) who paid a single fee of $500, annual members (now 180) who pay an annual fee of $25, besides honorary and corresponding members. It also uses for purchases the interest on its invested capital of $75,000, but has no support at all from the State or the city. Its yearly income for administrative purposes reaches $5,000.

[a] See on this subject B. E. Simon, Ueber Rostbildung und Eisenanstriche. Eine kritische Studie. Berlin, 1896, 43 pp.

[b] A list of other publications of the society from 1856 on is found in the Annual Report of the American Historical Association for the year 1890 (Washington, 1891, pp. 197–203); also in the report of that association for the year 1895. For general data relating to the society see Chicago Historical Society—Officers, Members, Constitution, By-laws—Chicago, 1894, 22 pages, and the chapter on this subject in History of Chicago, R. Blanchard, I, pp. 640–647, 1899.

12. ART INSTITUTE OF CHICAGO.

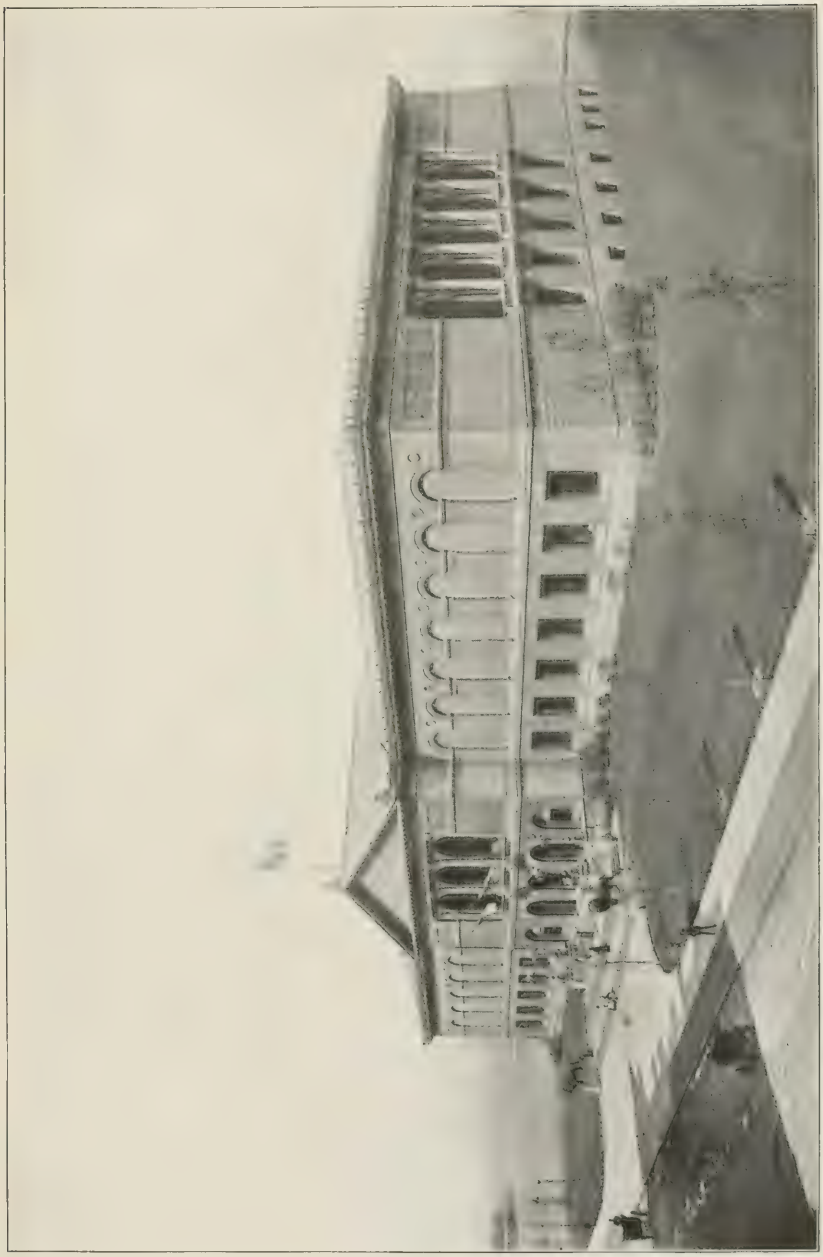
From an art school founded in 1866 rose The Chicago Academy of Design, which until 1882 was the only notable art center of the city. In 1879 it was organized anew as the Chicago Academy of Fine Arts, and incorporated by the State "for the founding and maintenance of schools of art and design, the formation and exhibition of collections of objects of art, and the cultivation and extension of the arts of design, by appropriate means." In 1883 it was given its present name.

First installed in rented rooms the society obtained in 1882 and 1885 (obliquely across from its present home) a large piece of ground, upon a part of which it built, but in 1886 it erected there a fine museum, 100 feet long and 87 feet wide, of a Romanesque style, after plans of J. W. Root (Plate 21). As this soon became too small it was in 1892 sold for $400,000 to the Chicago Club[a] in order that there might be erected in 1893 the present spacious building, near the edge of the lake, in the extensive Lake Front Park.

The origin and history of the present building is not without interest. It shows what advantage a great exposition may be to the development of a city. We have seen this already in the Field Columbian Museum. Buffalo, also, in this year (1901), doubtless will obtain important benefits through the Pan-American Exposition (see p. 405). The Chicago Exposition in 1893 needed a building for holding congresses, and by mutual agreement with the art institute this one was built upon a site belonging to the city, on the lake front, near the busiest section. The exposition paid $200,000, the art institute $500,000, and the city gave the site, 425 feet long, on the broad Michigan avenue under the condition that the property rights in the building should belong to it, but that the art institute should occupy it rent free, so long as they use it for its present purposes. The art institute therefore presented it to the city. The plans were made by the architects, Shepley, Rutan & Coolidge, in Italian renaissance style, the details "classic and of Ionic and Corinthian orders." The magnificent bronze lions of E. Kemeys flank the broad stairway of approach. The building is 350 feet long, 185 to 225 feet wide (the Dresden gallery of paintings occupies only about half the space), and 75 to 85 feet high from basement up. It is fireproof, being built of Bedford limestone and brick, but the floors and window frames, doors, skylights,[b] and furniture are of wood, and in some cases the partitions are wainscoated with it. The steam-heating

[a] I had the privilege of frequenting this club. The high, spacious halls, with an unobstructed view of the lake, together with the conveniences which American clubs of the first rank offer, make it an uncommonly attractive place of resort.

[b] In some rooms there are mosaic cement floors. It is intended, sometime, to lay all the floors in this way as well as to replace some of the woodwork with iron.



ART INSTITUTE OF CHICAGO.

apparatus is kept in a small, detached building. Natural gas is used for heating (see p. 440). In the house itself no fire is allowed to be lighted. The heating coils stand exposed in the middle of the hall, which is rather unsightly.

The fire service is especially well organized. The building and the collections are insured by a company which maintains a watch service for all its large customers. In every room there is an alarm. The watchman, who carries a lantern and does not use the electricity which is installed throughout the building, strikes this alarm hourly throughout the night, and thus a direct telegraphic communication is established with the watch room of the insurance company, and the official there knows whether each room has been inspected every hour. If the signal is omitted at any time some one immediately appears at the building from the fire-insurance company. Each morning a card showing the night report is sent to the director of the art institute. Through these precautions, in the special interest of the insurance company, great security is obtained, an arrangement certainly worthy of imitation. It is intended, however, to stop the insurance, which is practicable because of the isolation of the fireproof building—on the one side facing the lake, on two sides entirely free, and on the side toward the city 175 feet from the nearest buildings, which are also fireproof. Behind the museum, however, the railroad runs along the lake front, which, with its vast commerce, may well occasion some trouble.

For economical reasons ventilating apparatus was not provided. In the second story, however, panes of the lower skylight can be opened and fresh air admitted through windows below the roof (see fig. 44, arrow) into the empty space between these skylights and the fixed glass roof. On the ground floor air may be admitted by opening the large plate-glass windows, without crossbars, which turn vertically around an axis, a practical arrangement worthy of imitation, by means of which crossbars and their injurious effects are avoided.[a] It can be easily understood that this kind of ventilation is insufficient when the building is crowded with visitors. In the smoky atmosphere of Chicago, where soft coal is burned, the exterior of the beautiful museum is defaced in an ugly manner (as are the buildings in Dresden), and this also occurs in the interior, especially on the plaster casts. This last drawback could at least be avoided by ventilating with purified air and closed windows, as I have found done in various buildings in America (see for example the remarks below on the Chicago Public Library), an arrangement with which we are unacquainted in Germany.

[a] The panes are 10 feet high and 7 feet wide. Only every second window can be opened. To fit tightly some material is attached. Double windows are not considered necessary. Neither frost nor condensed vapor have any bad effects in winter, owing to the effective heating. During my visit one of these great window panes was shattered by a football hurled against it during a game in the adjoining park meadow.

In the plans[a] (see figs. 45 and 46) the building is simply arranged in a succession of large and small, broad and narrow rooms, and it is therefore easy to find one's way.

The light lines in the plans show rooms that are not yet built, among which is (20) a lofty hall for architectural casts, which is to be 240 feet long, 65 feet wide, and 36 feet high, and will soon be taken in hand; the monumental stairway is also wanting as yet. In the well-lighted

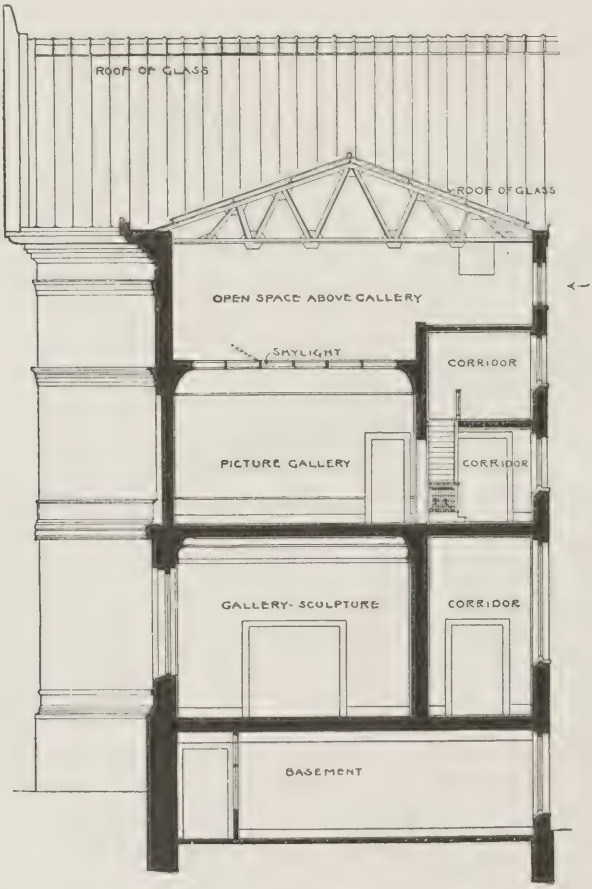
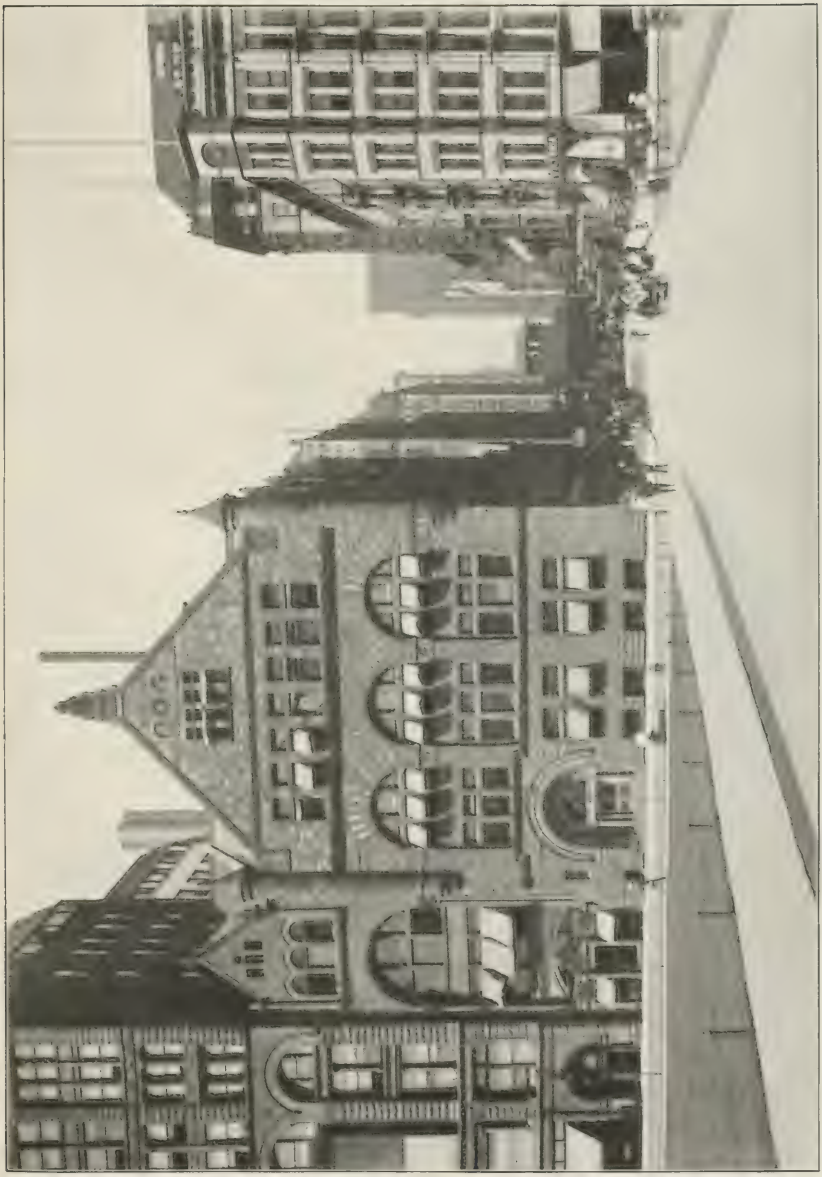


FIG. 44.—Art Institute of Chicago. Cross section.

basement, 12 feet high, are 20 rooms used as storerooms, packing rooms, lunch rooms, and for the art school that has, besides, 15 fireproof, skylighted rooms, situated in the rear, practically arranged, but somewhat contracted. These must eventually be torn down and moved forward when hall No. 20 of the first floor comes to be built,

[a] Compare also the plans published by A. Tiede, Museumsbaukunde, in *Baukunde des Architecten*, II, 1898, p. 30. The text, pp. 31–33, contains many inaccuracies.



ORIGINAL BUILDING OF THE ART INSTITUTE OF CHICAGO. (NOW THE CHICAGO CLUB.)

which, as was said, will soon be done.[a] As can be seen from the vertical section (fig. 44), there are a few rooms in a half story over the second floor (the uppermost of the "corridors"). There are, in fact, three of these on the inner side of each wing. These also serve the purposes of the art school or are used for temporary exhibits connected therewith. The halls of the first floor are well lighted, but they are too narrow for sculptures. In order to obtain a vista through the doors of the front halls from one end of the building to the other, which gives a pleasing effect (Plate 21), a row of casts has been shoved back (they are set on rollers) against the narrow window

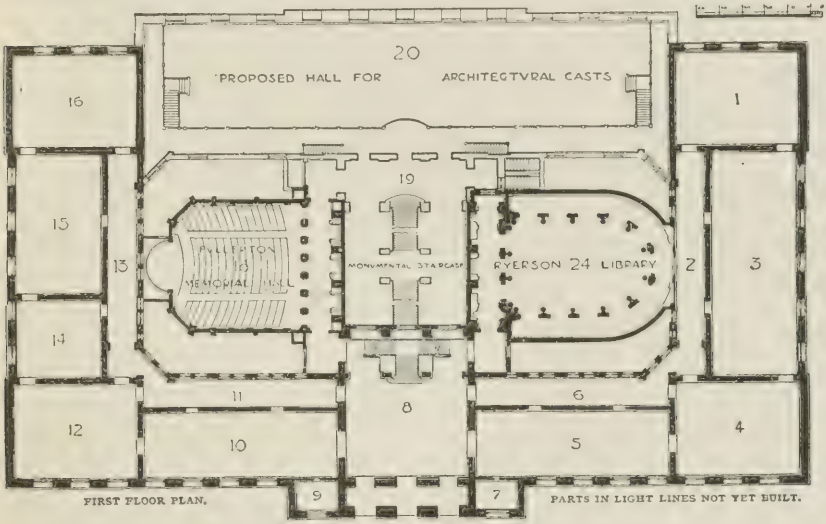


FIG. 45.—Art Institute of Chicago. First-floor plan.

Sculptures: 1, Egypt and Assyria; 2, Asia Minor and early Greece; 3, age of Phidias; 4, later Grecian; 5, Roman; 6, Renaissance; 8 and 10, modern; 11–13, French (including architecture); 7, director; 9, secretary; 14, bronzes, reproductions after those of Pompeii and Herculaneum; 15, Egyptian and classical antiquities; 16, library (until room 24, now building [ready since 1901], is ready); 18, lecture hall; 20, projected hall for architectural casts. The light lines indicate rooms that have been planned but not yet built.

sides, so that it is necessary to look against the light. For the larger pieces it would have been desirable to have the halls, which, besides, are crowded, higher than 20 feet. The building of the lecture hall (18), the library (24), and the staircase, when completed, will interfere with the lighting of the corridors (2, 6, 11, 13), as they can then receive light only through a shaft. The second floor, including the corridors (29–33, 37, 44), is divided into 15 beautiful lofty halls, 18 to 25 feet high, lighted from above. The entire structure is provided with a glass roof, but every room has a glass skylight ceiling of its own set below this (see fig. 44). The space between this glass ceiling and the fixed glass roof, 5 feet 6 inches to 13 feet high, serves, as

[a] This is now done, 1903.

already mentioned, for ventilation. The oil paintings are all covered with plate glass which renders their inspection difficult, but a few of the picture halls, furnished with red plush hangings and dark wooden wainscoting in unusually good taste, are exceedingly charming, and as they are moderately filled with masterpieces they make, with their subdued light, a most agreeable impression. Instead of tempering the light in the middle of the room with cloth in the usual manner, glass decorated in colors is used, which, however, absorbs much light and diverts attention from the exhibits (Plate 22). The lecture hall (18), which occupies both the first and the second stories, holds 500 persons, and is one of the most pleasing halls of the

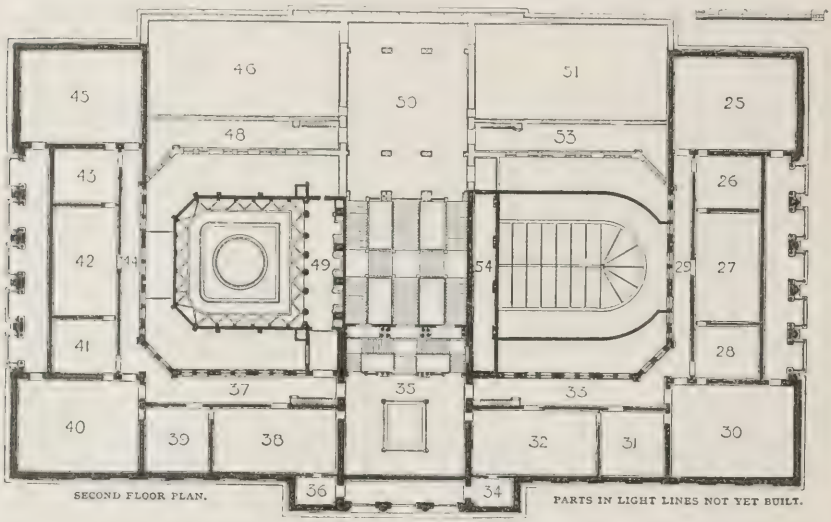


FIG. 46.—Art Institute of Chicago. Second-floor plan.

25–31, temporary exhibits; 32, paintings of old masters; 33, reproductions of the Arundel Society; 34 and 36, committee rooms; 35 and 37, sculptures and paintings; 38–40, paintings; 41 and 42, paintings, Chinese and Japanese collection; 43–45, works of art, musical instruments, etc. (because of continual additions the arrangement changes). The light lines indicate rooms that have been planned but not yet built.

kind with which I am acquainted. The library (24), which likewise extends through both stories, was not completed in 1899, but is now almost ready, a patron of the institute having expended $50,000 for it. The entire cost of the building up to the end of 1899 was about $700,000. For the completion of the scheme as shown in figs. 45 and 46, $200,000 more are needed, which is now being collected.

The Art Institute is entirely independent and obtains no support from the city, to say nothing of the State, except that the city, as already mentioned, gave the ground for a site, in exchange for which it obtained the property right of the building. The yearly expenditure for 1899–1900[a] was about $90,000, the art school costing $38,000, which

[a] See Twenty-first Annual Report, June 1, 1899, to June 1, 1900, 94 pp.

ART INSTITUTE OF CHICAGO.

Hall of sculpture.

was, however, wholly repaid by the pupils. The $50,000 for the institute proper is divided, in round numbers, as follows: Salaries, $23,500; cost of temporary exhibitions, $7,400; heating and lighting, $4,300; printing (17 catalogues and the like, and many circulars), $2,400; postage, $2,800; insurance and watch service, $2,000; lectures, $2,300; purchases, $1,000; miscellaneous, $5,000. The receipts were as follows: Dues of members, $32,000; admission fees, $4,500; sale of catalogues, $1,200; sundry receipts, $6,800; deficit, $7,500.[a]

At the head of the institute is a board of trustees of 23 persons, who from their number select a president and a vice-president, as well as an executive committee of seven and an art committee of five members. The society had, in June, 1900, 245 "governing members,"[b] who are elected and who pay an entrance fee of $100, and $25 annually; 2,140 annual members who pay a yearly fee of $10; 84 life members who pay a fee of $100 at one time, which must be invested; and 8 honorary members. The museum is controlled by a director, with a secretary, a treasurer, a librarian, and some assistants. There are besides 4 clerks, 1 engineer with assistants, 1 attendant with assistants, 1 janitor, 1 house servant with assistants, 9 watchmen for day and night service—altogether 30 salaried employees, exclusive of the teachers at the art school. But as the director has also to conduct the art school and lecture there (he is besides a teacher in the University of Chicago), there is placed upon him an enormous burden of work. The necessary subordinate heads of divisions are wanting, and thereby the scientific use of the material of the museum is not assured, a state of things which can not last. A museum that does not publish lives only for the narrow circle of its visitors and not for the rest of the world, but since it is wholly dependent upon and receiving from this outer world, it is morally bound to give an adequate equivalent. In America, as I have already several times said, there is generally too great parsimony in museum service, and the employees are thereby overworked. It is also worthy of remark that an employee in America can not, as in European institutions, withdraw and intrench himself behind "official business," but he must always be ready to talk to anyone and be at anyone's service.

The collection is open week days from 9 a. m. to 5 p. m., and Sundays from 1 to 5 p. m. Admission is free on Wednesdays, Saturdays,

[a] Such a deficit is always quickly made up. For instance, there was in the previous year $4,000 due for interest on borrowed capital, but upon appeal there was, within ten days, $110,000 raised from 60 persons, in sums from $500 to $1,000. Since the organization of the society, $500,000 in cash has been given. Various legacies, amounting to from $200,000 to $225,000, are not yet available, but are to be kept as capital. Up to the present time $100,000 is capitalized, for the greater part for special purposes, such as the purchase of pictures, scholarships, etc.

[b] The entire property and the control of the art institute are vested in the governing membership, limited in number to 250, who hold it in trust for the public.

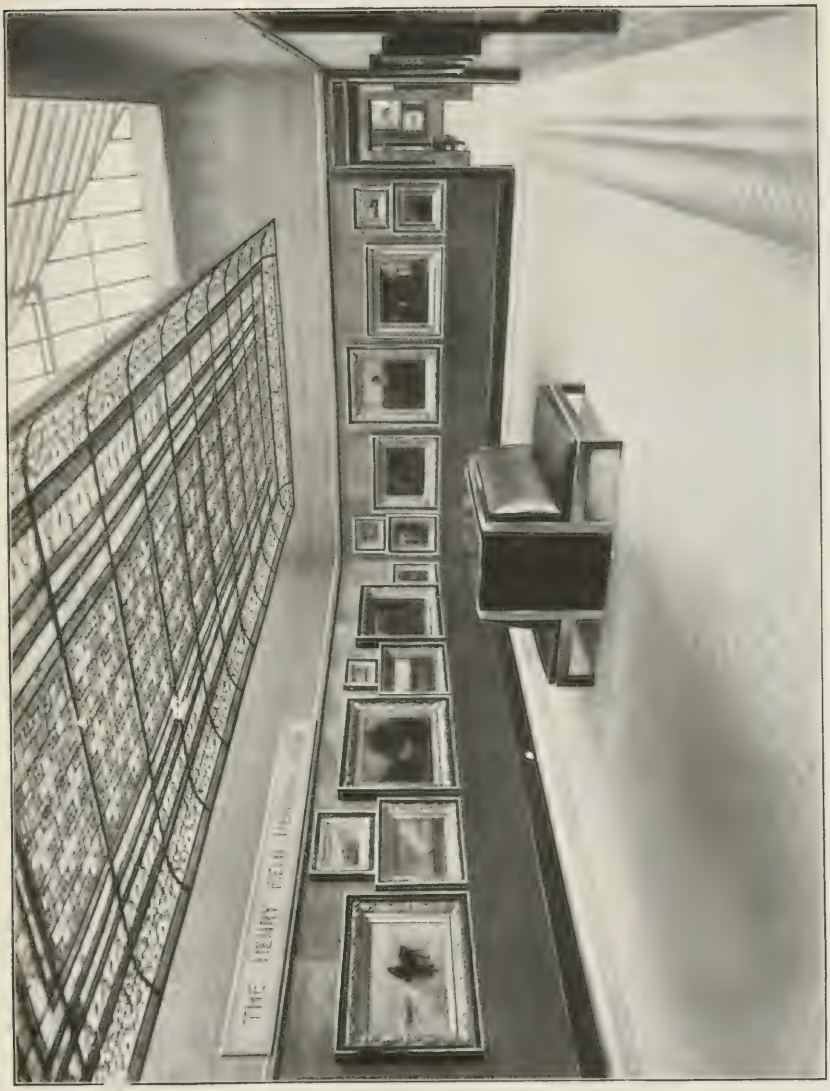
and Sundays;[a] on the other four days a fee of 25 cents is charged. In 1899–1900 it was visited by 577,421 persons, 17,995 of whom paid. (In 1898–99 there were 40,491 who paid, because of a separate exhibition which drew a good many.) The greatest number on any one day (Sunday) was 10,759; the smallest, 54, on a pay day. This large number of visitors is very remarkable, for the great Field Columbian Museum in the same city had in 1899–1900 only 266,899 (in 1898–99 even less, 223,304), chiefly, indeed, because of its distant location. In New York, with double the population, the Metropolitan Museum in 1899 had 540,000 visitors, and the American Museum of Natural History had, in 1900, 523,522.[b] The reasons for this lie, first, in the favorable location of the art institute, near the heart of the city, and then in the excellent and instructive installation and labeling of the entire collection (quite a contrast to the New York Art Museum), and perhaps, also, in the active and aspiring spirit of the inhabitants of Chicago. Besides, the frequent temporary exhibitions attract a considerable attendance, an arrangement adopted either not at all or only to a limited extent by the museums which I have compared above. There are also comprised in the total number 20,000 persons who attended the lectures, and 80,000 represent art school students who are counted each day; but in any case this comparatively lively interest which the people take must afford just satisfaction to the men who have devoted their time and their means to advance the interests of the art institute.

The collection of sculpture appears, from the catalogue of "sculpture and painting," of September, 1898, to consist of 632 numbers, almost all of which are casts. Modern sculptors are also represented for instance, Barrias, Bartlett, Barye, Cain, Chapu, Daillion, Delaplanche, Donoghue, Dubois, Elwell, Ericksson, Falguière, Frémiet, French, Gelert, Gérôme, Hasselberg, Houdon, Idrac, Joy, Massoulle, Mercié, Molin, Peterson, Potter, Rodin, St. Gaudens, St. Marceaux, Thornycroft, Tilden, Wuertz, and others,[c] three of these with originals. In 1893 the French Government sent to the Chicago Exposition an extensive historical collection of architectural casts, unique of its kind, which was assigned to the art institute. It will be exhibited in its entirety in hall No. 20 when that is completed. I will also mention 109 facsimiles in bronze, after originals in the Naples Museum, from Pompeii and Herculaneum, which were also sent to the exposition; Grecian, Roman, and Egyptian antiques, among the last a most rich

[a] "It is the earnest wish of the trustees that every man, woman, and child in Chicago should enjoy the educational advantages afforded by the institute, and for this object the galleries are open free on Wednesday, Saturday, and Sunday." The institute has the declared purpose of serving the people.

[b] The British Museum had in 1900 only 689,249 visitors (43,892 on Sundays), with a population in London of about 5,000,000; the Museum of Natural History had only 485,288; and the South Kensington Museum 846,489 (87,854 on Sundays).

[c] Only two of those named are represented in the Dresden sculpture gallery.



ART INSTITUTE OF CHICAGO.
Picture gallery on first floor.

and extensive collection of scarabæi, also a large collection of nephrites,[a] 117 in number (Plate 23), which is, perhaps, only excelled by the collection of Mr. Bishop in the Metropolitan Museum of Art in New York City. Industrial arts are also notably represented.

The principal attraction of the museum, however, is the gallery of paintings, with some 500 pictures by over 300 artists, part of which, indeed, are only lent, but most of them will later become the property of the institute. Among them are several pictures for which the former owners paid $30,000 to $40,000, and many for which $10,000 to $20,000 were paid, almost all being large gifts or legacies. While with us most collectors sell their pictures already during their lifetime, or their heirs do it after their death, the rich Americans take pride in bequeathing theirs to a public institution.

The modern portion of the collection, especially pictures of the School of Fountainebleau, has hardly its equal in Europe, only the New York collections (see pp. 345, 350) being comparable with it. Of French artists there are exhibited Benjamin-Constant, Besnard, Rosa Bonheur (3), Bonnat, Bouguereau (3), Jules Breton (6), Cabanel, Cazin (6), Corot (8), Courbet, Couture, Daubigny (7), Decamps (3), Degas, Delacroix (4), Detaille, Diaz (8), Jules Dupré (9), Fragonard, Fromentin (3), Gérôme (2), Greuze, Gudin, Hébert, Henner (2), Isabey (2), Jacques (4), Lhermitte (3), van Marcke, Meissonier (2), Michel, Millet (3), Monet, de Neuville (3), Puvis de Chavannes, Robert, Rousseau (5), Roybet, Troyon (9), Ziem, and 31 other masters.

Of American artists I will name (partly represented by free-hand drawings, etchings, etc.,) Abbey (2), Bierstadt, Blum (3), Bridgman (2), Bristol, Bursh (2), H. and W. Chase (3), Church (5), Thomas Cole, Cox, Dannat, Charles Davis, Durand, Elliott, Fuller, Gibson, Gifford, de Haas, Thomas A. and B. Harrison, Hart, Hitchcock, G. Inness (8), G. Inness, jr.; Kappes (2), Leutze, Lungren, Martin, Murphy, Neal, Parsons (4), Pearce, Pennell (4), Reinhart (3), Richards, Sargent, Shirlaw (5), Stuart, Thayer, Vedder, Weeks, and J. A. M. Whistler.[b]

Among the recent painters of other nations that are exhibited (partly in free-hand drawings) are the following: A. and O. Achenbach, Brozik, Chierici, Constable (2), Fortuny y Carbo, Gainsborough, Grützner (2), Israels (2), Jettel (3), Knaus, Koekkoek (4), Lawrence, Lenbach

[a] This collection was presented in 1900, together with oil paintings, water colors, porcelains, crystals, etc., 1,300 objects in all, valued at $300,000. See the catalogue of The Nickerson Collection, 147 pages, with over 1,000 numbers.

[b] The American artists are treated by R. Muther in his Geschichte der Malerei im XIX Jahrhundert, III, 1894, pp. 366–405. He makes much use therein of R. Koehler's article in *Kunst für Alle*, 8th year, 1893, pp. 225, 241, and 257: Die Entwicklung der Schönen Künste in den Vereinigten Staaten von Nordamerika, and closes with the words, "America, therefore, has an art. * * * The American artists are the most modern of the moderns." Except in art circles very little is known among us of these things in America.

(free-hand drawing), Makart, Makovsky, Max (3), Meyer von Bremen, Michetti, Mücke, Munkáscy (3), Pasini (3), Pettenkofen, Reynolds (2), Schödl, Schreyer, Velten, Verboeckhoven (5), Wahlberg, Webb, Wenglein, Zimmermann.

The collection of old masters is certainly not large, as indeed lies in the very nature of things, but it is worthy of attention. From the Demidoff auction in 1880 13 selected pieces, mostly of the Dutch school, were withdrawn, which in 1890 the art institute was able to buy; these were portraits of Rembrandt, Rubens, van Dyck, Franz Hals the elder, and Holbein, the Guitar Lesson of Ter Borch, a Family Concert of Jan Steen, an excellent landscape of Hobbema, the Jubilee of Ostade, as well as pictures of Teniers the younger, Ruisdael and A. and W. van de Velde. There are also examples of L. and H. Backhuysen, Berchem, Brueghel the elder, van Croos, Aelbert Cuyp, Fouquières, Frans Francken the younger, Ghirlandajo, van Goyen, Guardi, de Keyser, W. van Mieris, Mor, Murillo (2), A. van der Neer, Perugino (4), Rembrandt, H. Saft-Leven, Sorgh (2), Teniers the younger (2), Ter Borch, Titian, P. Veronese (2), Wouverman.

I have given this enumeration somewhat at length for the reason that in Europe, even in art circles, we are hardly at all aware that Chicago can show so much in this field.

Besides this permanent collection the art institute holds yearly, in addition to exhibits of single fine pictures from private collections and school exhibits, a considerable number of temporary exhibitions (23 in 1900) for which catalogues are issued, distinguished by their tasteful appearance, the following, among the more recent, for example: Catalogue of the Thirteenth Annual Exhibition of Oil Paintings and Sculpture by American Artists, October 30 to December 9, 1900 (281 numbers, 48 pages); Catalogue of a Loan Exhibition of Selected Works of Modern Masters, January 8 to 27, 1901 (63 numbers, 24 pages, among them a series of eminent masterpieces such as it would hardly be possible to get together in Dresden); Catalogue of an Exhibition of Works by Chicago Artists, January 31 to February 24, 1901 (198 numbers, 40 pages); Catalogue of Works of Dagnan-Bouveret, March 1-24, 1901 (29 numbers, 16 pages); Exhibition of Works of Elihu Vedder, March 28 to April 15, 1901 (49 numbers, 24 pages); Catalogue of the Thirteenth Annual Exhibition of Water Colors, Pastels, and Miniatures by American Artists, April 25 to June 9, 1901 (376 numbers, 51 pages), and others.

The library contains only 2,263 volumes, but including, however, many expensive works, besides over 16,000 of the large Braun autotypes. It is open daily, except on Sundays and holidays, from 9 a. m. to 5 p. m.; on three days also until 7 p. m. for the accommodation of the pupils of the art school.

In 1900 there were given in the lecture hall for members and their

ART INSTITUTE OF CHICAGO.

Exhibit of jade objects.

friends 90 lectures on art, also on music with musical performances; besides 41 lectures for the art students and 24 for other art associations.

I will briefly mention the art school. It is one of the most frequented in the United States. In 1900 it had over 1,900 students, 740 regular day students, 500 evening students, 794 Saturday students. In the day classes in 1899 there were 25 teachers, including prominent persons from without, whose services were temporarily secured, 10 in the evening classes and 35 students, who received a total compensation of $29,000. The models cost $3,000, heating and lighting $1,750 (see also Circular of Instruction of the School of Drawing, Painting, Modeling, Decorative, Designing, and Architecture, 1900–1901, 191 pages, with many illustrations, 1900).

It is estimated that the collections of paintings, sculptures, antiquities, and other objects of art belonging to the art institute are of the value of about $850,000. The cost of the building has been $708,000. The land, 400 feet, estimated on the basis of the property opposite, on Michigan avenue, is worth not less than $1,600,000, a total of $3,158,000. The loan collections constantly exhibited are probably of the value of $300,000. The total amount of cash subscriptions paid into the Art Institute since its organization in 1879 is about $500,000.

It is, in fact, admirable and worthy of respect, that so important a work as that achieved and presented by the Chicago Art Institute should have been accomplished without great, private benefactions—I mean "great" in the American sense, as they are made to other institutions in America[a]—and without aid from the State or city; and it is difficult, for us at least, to understand why the city, as such, is not sufficiently ambitious to feel it a duty to support an art society that has already attained so high a rank, in order that it may compete with the first in the world. We can only suppose that the city fathers do not appreciate the educational worth of art.

In one of the last annual reports it is said, "The Art Institute has accomplished something; it aspires to accomplish much more." The present beautiful product is regarded only as the beginning of a greater one, and they are already thinking of either adding lateral wings or of bridging over the railroad and erecting a second building in the park beyond, nearer the edge of the lake. Who, indeed, who has learned on the spot to know and admire the enterprising spirit of Chicago, can have the least doubt but that the future development will go far beyond such plans?

13. JOHN CRERAR LIBRARY.

The history of this library is as simple as it is unusual and brief. In 1886 John Crerar, a merchant who had lived in Chicago since 1862,[b]

[a] For example, the Metropolitan Museum of Art in New York recently obtained a legacy of $8,000,000.

[b] Of Scotch extraction, born in New York. See Appleton's Cyclopedia of American Biography, new edition; also M. Kirkland's History of Chicago, 1895, and Will of John Crerar, who died in Chicago, October 19, 1889, 23 pages.

bequeathed the greater part of his property, after deducting numerous private and public legacies,[a] for founding a "free public library" in the southern part of the city, as the northern part was already provided with such an one in the Newberry Library (see p. 459). He desired the erection of a tasteful, solid, fireproof building. Only such books and journals were to be included as might create and sustain a healthy moral and Christian sentiment in the community; all offensive and immoral works were to be excluded. Concerning such books, he said:

> I do not mean by this that there shall not be anything but hymn books and sermons, but I mean that dirty French novels and all skeptical trash and works of questionable moral tone shall never be found in this library. I want its atmosphere that of Christian refinement, and its aim and object the building up of character.

In 1889 the excellent man died. In 1894 the library was incorporated by the State, in 1895 organized, and in 1897 opened. I said above that its history is short, but it nevertheless contains much that is instructive and worth noting.

The testator himself had named thirteen of his friends as "directors," two of whom were his executors. They cooperated with the other principal libraries in Chicago so that the Crerar Library was to give special attention to the natural sciences exclusive of medicine, to the social sciences, and technology; the Newberry (see p. 459) to medicine, history, art, and the humanities; the university (see p. 491) to philology, and the Public Library (see p. 473) to the whole, more popular literature for household reading. The idea that by a cooperative division of this sort the institutions above named would attain the greatest possible use for the general good is as wise as it is rare, and will certainly be productive of the most excellent results. The exact programme of the Crerar Library is as follows:

I. *General works.*—Bibliography, library economy, cyclopedias, general periodicals, general societies, exhibitions and museums, psychology, logic, history and geography, cartography.

II. *Social sciences.*—Ethics, statistics, political science, political economy, administration (including public documents), associations and institutions, education, commerce and communication, customs, folklore, etc.

III. *Physical sciences.*—Mathematics, astronomy, physics, chemistry, and mineralogy.

IV. *Natural sciences.*—Geology, paleontology, biology, botany, zoology.

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[a] The last-named legacies amounted to $1,000,000 for ecclesiastical, benevolent, and educational purposes, among which were $100,000 for a Lincoln statue, and $25,000 for the Chicago Historical Society (see p. 439). The will was contested by the relatives, but without result, concerning which a series of papers, some of which were quite extensive, were published in 1892.

JOHN CRERAR LIBRARY.

Chicago, Illinois.

V. *Applied sciences.*—Engineering, agriculture, domestic economy, trade and transportation, chemical technology, manufactures and trades, building, landscape gardening, architecture, drawing, designing, etc., photography.[a]

It was concluded, awaiting the time when sufficient capital should be collected to admit of building a house, to rent quarters, and very suitable ones were found in one of the many great business houses in the heart of the city. There was chosen the sixth story of a new addition to the wholesale house of Marshall Field & Co.,[b] near the principal business centers, the public library, and the art institute.

Recently (in 1900) a portion of the fifth story was added. The nine-storied building, designed by the architect D. H. Burnham in 1893 (Plate 24), is a vast rectangle 148 feet long and 100 feet wide, with an inner court. The entire floor was specially fitted in an extremely convenient manner for the John Crerar Library by the architects Shepley, Rutan & Coolidge, who designed the art institute and the public library. The reading room (Plate 25), looking toward the east, is 85 feet long by 50 feet wide and has 75 seats; the principal library hall (Plate 26) is 88 feet long by 42 feet wide and looks toward the south. The inner court being of too small dimensions (72 by 40 feet) for the height of the

[a] The complete scheme has under these 5 divisions 77 subdivisions instead of the 39 here mentioned. It is based on the Dewey decimal system.

[b] The proprietor of this vast business is Mr. Marshall Field, the Mæcenas of the Field Columbian Museum, which bears his name (see p. 410), and one of the Mæcenates of the University of Chicago (see p. 491). The house carries on a retail and a wholesale business, the latter in an enormous building in Adams street, made after the plans of Richardson with striking architectural features, the former on a corner of State and Washington streets, the new building in which the Crerar Library is installed and which is connected with the old building, being on the corner of Washington street and Wabash avenue. In the wholesale department 5,000 persons are employed; in the retail bazaar 4,000, which number, after the completion of a second new building, is to be increased by 2,000. The fittings and furniture of the rooms are prominent, the mahogany cases are of the best make; order and neatness prevail. The building is fireproof, with external iron shutters except for the ground floor. One may judge of the refinement that rules here by the fact that extra articles of food for diabetics can be found on the tastefully designed menu card of the lunch room which is frequented by hundreds of persons and open daily from 8.30 to 5 o'clock, and where both hot and cold articles of food can be obtained (there are more than 150 dishes and nonalcoholic beverages, from 5 cents to 40 cents). At the present time the firm is erecting on the corner of State and Randolph streets, adjoining the old building, corner of State and Washington streets, after the design of the Architect Graham, a palace of 12 stories out of white granite, so that the State street front of the establishment will be 425 long. This front will be ornamented with granite Ionic pillars from 30 to 70 feet high, and the vestibule will be lined with Carrara marble. The cost will reach $1,500,000. Everything will be fitted up with the most recent improvements. [Now completed, 1903.] During my visit in 1899 the firm had half of the street in front of the house (about 38 feet broad) asphalted at its own expense, because the pavement, as is usual in Chicago, was bad and the city would do nothing. Marshall Field & Co. wished in this way to give an example for the emulation of others and also to remind the officials of their duty.

building, which was planned for other purposes, the lighting is not in all parts sufficient. Including the rooms in the fifth story there are accommodations for 135,000 books. It would be a mistake to suppose that the elevated situation of the sixth story makes it difficult of access, for there are three elevators in operation[a] by which the sixth floor can be reached sooner than by climbing the stairway even to the second floor. The building is fireproof and, like many American houses, has fire-escape ladders on the outside; within only extinguishers are used for security. The floors are covered with cork linoleum of the best quality, about a third of an inch thick. The house furnishes steam heat and electric light. There is no special arrangement for ventilation,[b] the high rooms, large windows, and elevator shafts sufficing to change the air. In a later building it is proposed to seal the windows hermetically and to force in filtered and purified air, a system now applied in many places, as in the Congressional Library at Washington, and of which I shall speak more fully under the Public Library of Chicago. Recently there has been established a small auditorium for 30 persons, which can also be used by scientific societies, such as the Bibliographical Society, the Entomological Society, the Mycological Society, the Illinois Association of Public Accountants, and the Institute of Education. There is a special lunch room for employees.

The book stacks are of iron, the other furniture of wood. In spite of the excellent examples in Boston, New York, and elsewhere, and notwithstanding the rigorous application of this principle in the Chicago Historical Society (see p. 439), wooden furniture has been employed, and this will always offer a point of attack for fire. The iron book stacks, as well as most of the wooden library furniture, were furnished by the Library Bureau of Boston, a grand institution which I hope to be able to describe in the course of my reports. Their model for book stacks, however, is not as satisfactory as many others (see p. 382). It is less stable and the ends are overornamented, creating a bad impression when a number are taken together. The shelves are of white wood veneered with oak, instead of iron. The newer racks in the fifth story are, as I have recently been informed, steadier, less ornamented, and smoother, whereby the books are less liable to injury. A practical form of book support[c] is used to prevent

[a] There is also one for freight. Two of the three passenger elevators go directly to the John Crerar Library, without stopping at the intervening floors; they are the so-called "express trains."

[b] Except that in the window frames of the reading room there is provided a small ventilating apparatus which the American Ventilator Company has patented and called the "sash ventilator and lifter combined." It consists essentially of perforating the lower window frame with holes through which air may enter if it is desired.

[c] Furnished by John Joseph McVey, publisher, etc., 39 North Thirteenth street, Philadelphia. Cost, $10 a hundred. This firm also makes another kind of book support with label holders,

JOHN CRERAR LIBRARY.

Reading room.

the books falling down when the shelf is not full. The vertical arm has two rounded wings standing out at right angles to it. When books are quickly put up these prevent the thin plate from passing between the book leaves and injuring them, as often occurs when other kinds of supports are used. If an employee of the library takes a book from a case for his own temporary use he puts a red card in its place; the books that are given out to the public are recorded only in the office.

The library now contains 70,000 volumes. The normal yearly increase has hitherto been about 10,000 volumes. In 1900 there were of general works, 13,590; social sciences, 16,106; physical sciences, 10,380; natural sciences, 9,134, and applied sciences, 16,435. It may be remarked that the 14 per cent devoted to the natural sciences cost three times as much as did the 24 per cent devoted to the social sciences. According to the agreement which was previously mentioned there were bought from the Newberry Library 8,023 volumes on natural science for $16,000, besides 300 special ornithological works for $4,500.

The library is catalogued according to the rules of Linderfelt[a] and classified according to the system of Dewey,[b] with independent amplifications. The lettering and the numbering are printed with gold directly upon the backs of the books. The greatest care has been given in the selection of bindings, and the edges of many volumes are gilded in order that they may be more easily cleaned in the dusty and sooty atmosphere of the center of the city. Pamphlets are simply bound and provisionally kept in cases. In 1900 there were 5,431 volumes bound at a cost of $5,570, or at an average of about $1.19 a volume. The printed card catalogue, directly accessible to the public, contained in 1900 over 90,000 cards, 41,000 of them author cards and 49,000 subject cards, among which were also a small number of those published by the American Library Association.[c] There are also about 30,000 cards to which are added bibliographical information from the Concilium Bibliographicum in Zürich, from the American Library Association, from the Torrey Botanical Club, from the Department of Agriculture in Washington, from the Bibliographie des Sciences Mathématiques in Brussels, and some others. This bibliographic information, accordingly, relates to zoology, agriculture, American botanical literature, names of new botanical genera and species, math-

[a] K. A. Linderfelt. Eclectic Card Catalogue Rules. Boston, 1890.

[b] M. Dewey. Decimal Classification, etc., 5th ed., Boston, 1894. See also p. 399 of this paper.

[c] These relate to 250 scientific societies, institutes, and periodicals which, by division of labor, are written by the John Crerar Library, the New York Public Library, the Boston Athenæum, the Harvard University Library in Cambridge, and the Columbia University Library in New York. The John Crerar Library includes however in its card catalogue only such of the cards as relate to the books and pamphlets in its possession.

ematics, and photography. The card catalogue proper of the John Crerar Library is distinguished by its exact and beautiful execution and by the originality of its arrangement, which is said to be unique of its kind. It is arranged in three parts: (1) alphabetically, according to authors and titles; (2) according to subjects, numerically in the decimal classification, and at the same time chronologically; (3) an alphabetical subject index to No. 2.[a] Twenty copies of the cards are printed, for besides their use for the various catalogues, sets are sent gratis to the Armour Institute of Technology, the Public Library, the Field Columbian Museum, the Newberry Library,[b] and the University of Chicago, also to the Northwestern University, in Evanston, Illinois, and the University of Illinois, in Champaign, Illinois, under the condition that they shall be arranged and made accessible to the public. Each title costs the John Crerar Library 50 cents, including the electrotype. (See below.) The regular issue of special catalogues is planned and has been begun with a list of the library placed in the reading room (A List of Books in the Reading Room, January, 1900, 251 pages, Lex., octavo). In the reading room are about 3,000 volumes. The printing of this catalogue was made from electrotypes. From the type setting of the card is formed a thin cast, which costs 6 cents. These casts, numbering 23,354 in 1900, are preserved in regular order, and in their prescribed serial order,[c] are used for printing. In this way both manuscript and corrections are spared. This catalogue must be the very first book to be produced in this manner, a plan which was suggested half a century ago by C. C. Jewett, the librarian of the Smithsonian Institution in Washington, who proposed that a central catalogue bureau should make such casts, from which every library could print their own cata-

[a] See, for more exact information, the Second Annual Report of the John Crerar Library, 1896, p. 10 (1897), also the Third Report, 1897, p. 18 (1898). The library also has a fourth kind of card catalogue, the so-called "official catalog" for the employees, which contains in one alphabet everything that concerns any work that is extant or taken into consideration, including notices of it, etc., a complicated, ingenious, and very useful device, a more detailed description of which I do not give here. A "dictionary catalog," that is to say, one in which everything is arranged alphabetically according to authors and subjects as in a dictionary, is not provided. Compare C. A. Cutter, Rules for a Dictionary Catalogue, 3d ed., Washington, 1891 (U. S. Bureau of Education. Special Report on Public Libraries, Pt. 2.).

[b] The Newberry Library has recently declined to receive them, perhaps because the arrangement and care of 6,000 cards annually occasioned too great an expense considering the slight use made of them by the public, or because their size did not fit their "indexer," to which I shall recur below. The six other libraries, however, upon inquiry, desired to continue to receive them.

[c] C. W. Andrews. Printed Card Catalogues. Transactions and Proceedings of the Second International Library Conference. London, 1897 (1898), pp. 126–128. See also F. Milkau's more detailed description in Centralkataloge und Titeldrucke, 1898, p. 99.

JOHN CRERAR LIBRARY.

Book stacks.

logue.[a] The printing is finely executed. Electrotyping is cheaper than printing.[b] A page costs a little over a dollar, or with a large edition it is reduced to about 55 cents. The titles are arranged systematically in 9 divisions and 67 subdivisions; within these, however, they are also systematically, not alphabetically, arranged. The alphabetical index at the end, with 2,000 entries, contains, beside authors, also certain titles. The catalogue is sold in the library for a nominal price of 20 cents; by mail, 30 cents. There are also printed six instructive reports, distinguished among similar publications for their clearness and completeness; a list of current periodicals, 1897, 20 pages, linotyped; the by-laws of the library, 1898, 14 pages, and a few circulars. In 1900 the library received 2,017 periodicals, at an expenditure for subscriptions of $4,261.27 (396 were presented).[c] In accordance with its programme it offers an unusually rich collection of scientific journals and publications of learned societies. The entry book for these is very practically arranged.

The library is opened on week days from 9 a. m. till 10 p. m., and is closed on Sundays. The books in the reading room may be consulted without formality by anyone, but after use are to be left on the tables. The current periodicals may be consulted in the periodical department or obtained for use in the reading room, like the books, by putting in a card for them. These are returned, after use, to the desk. The arrangement, according to the Dewey system, is such a practical one that on the average only a minute and thirty-eight seconds are required to place any book in the hands of the person asking for it. Books are lent out only in extraordinary cases, and then for but a short time, and only such books as are seldom called for. In case of special researches certain persons personally known to the director are allowed to take the books directly from the stacks. For that purpose permanent passes are issued. In 1900, 42 persons had such passes, and 32 used them 287 times. Besides, there were issued 730 single permissions to take books directly from the shelves. These books must be left lying upon the tables. Everything is recorded exactly, so that not only is the number of books used known, but also to what particular divisions they belong. In 1900 over 95,000 volumes and periodicals were used. Very valuable and rare books may be consulted only in the presence of an attendant. The tracing of plans, etc., is allowed only on celluloid tablets, which can be obtained in the library.

As is everywhere evident, it is the one endeavor of the administration to make the library as useful as possible. A greater liberality than is here practiced can not be imagined, and it gives great satisfaction to

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[a] See Milkau, Centralkataloge und Titildrucke, 1898, p. 27.

[b] Sixth Report, 1900, p. 16, 1901.

[c] In 1899 there were 1,806, and of these 416 were general, 499 related to social sciences, 501 to natural sciences, and 480 to applied sciences.

know that, notwithstanding the absence of all such obstructions as are usually employed in Europe, the library since its foundation has lost only 14 volumes, and some of these, moreover, may yet be found, for an English library has recently reported the return of a volume that had been missing for forty-five years.[a] During the year 1900, 41,697 persons used the library, more than 20 per cent of them women; that is to say, an average of 134 daily (maximum 282, minimum 35). The daily average of evening visitors from 5 to 10 o'clock was 30. Order cards to the number of 32,653 were issued.

There are 28 employees, 10 of whom are women—5 librarians, 1 treasurer (and secretary), 13 assistants, 4 attendants, 3 pages, and 2 janitors. The hours of service in summer are from 9 a. m. to 5 p. m.; in winter till 5.30 p. m., with an hour for luncheon. From 5 to 10 in the evening another shift of employees comes on.

While the chief librarian is the actual leader and soul of the whole, the institution is controlled by a board of 13 directors, who from their own number choose a president, 2 vice-presidents, and a secretary. The directors, excepting the president, are also formed into four committees of 3 persons each, on finance, administration, buildings and grounds, and books.

The resources of the John Crerar Library, on the interest of which it is supported, in 1900 were $3,400,000; the reserved building fund is $319,000; the reserve book fund, $131,000, and besides there is a security reserve fund of $16,200. The assets are, therefore, almost $4,000,000. When the building fund reaches the necessary sum the erection of a special building will be taken up. Quite recently the chances for this have been much improved, and there is now a prospect for obtaining a favorable building site.[b] The financial course has been very sound from the beginning. It was determined that the capital should never be touched, neither for the purchase of a site, for the structure itself, nor for anything else whatever, but that all expenditures should be made entirely from the interests of the funded, bequeathed capital.

The expenditures in 1899 were for rent, light, etc., $13,331; salaries and wages, $25,006; printing, $2,303; books, $17,587; periodicals, $4,468; binding, lettering, repairs, $8,403; miscellaneous, $6,895, making a total of $77,994. As, however, the income from the interest reached $139,944, $61,950 could be applied to the building fund. The library is insured for $107,000.

The organization of the John Crerar Library is as exemplary as it is original. The library is, with the exception of those of the universities, one of the few purely scientific libraries in the United States. With its great wealth and its wisely restricted policy it will doubtless

[a] Fourth Annual Report of the John Crerar Library, 1898, p. 17, 1899.

[b] The construction of a new building will soon begin, 1903.

NEWBERRY LIBRARY.
Chicago, Illinois.

in time advance to a high rank and by the liberal principles of its administration become of great use. We may well be anxious to know how its librarian, Mr. C. W. Andrews, will solve the great problem of a new building after the many notable attempts in this line that have been made in the United States.

14. NEWBERRY LIBRARY.

This library, like the John Crerar Library, owes its existence to the generosity of a rich citizen of Chicago, Walter Loomis Newberry,[a] who died in 1868. In a will made in 1866[b] he left half of his property after the death of the direct heirs for a "free public library" in the northern part of the city, and directed his two trustees to use a portion of the bequest for buildings, but to invest the remainder as they might think proper "for the growth, preservation, permanence, and general usefulness of such library." After the direct heirs died in 1885, the property in question amounted to over $2,000,000,[c] and in 1887 there was $67,778 income available, so that steps could be taken toward its foundation. The two trustees took counsel with some other gentlemen, and it was decided to establish a reference library whose books should not be lent out—like the John Crerar Library, which has adopted that plan—as distinguished from a circulating library from which the books may be taken out. In the same year the erection of a temporary building on the site of the testator's residence in the northern part of the city was taken in hand, some rooms were rented for immediate use, and there was appointed a librarian, W. F. Poole, who for fourteen years had occupied a similar position in the public library of Chicago and was one of the leading librarians of America (among other things he founded in 1853 the Index to Periodical Literature which is still continued), and two other employees. Forty thousand dollars was appropriated for books and pamphlets. In the spring of 1888 some 14,000 volumes were installed in the provisional building, and the library was opened to the public.

At the beginning of 1890 a removal was made to another provisional building not far from the first one and near the site on which it was intended to build the final structure. This was a one-storied, fireproof

[a] W. L. Newberry, born in 1804; his ancestors came from England to America in 1630. He lived subsequent to 1833 as a banker in Chicago, possessed a fine library, belonged among others to the Chicago Board of Education, and was president of the Historical Society. From 1857, because of his health, he spent every winter in southern France. Not only is he renowned for his own magnificent benefaction which keeps his memory permanently green, but his example induced the foundation of the John Crerar Library in another part of the city (see p. 451).

[b] See The Newberry Library, Chicago. Certificate of Incorporation and Incorporation Act, p. 13 (27 pp.).

[c] Already in 1894 it had increased to $6,000,000, and as a great portion of it is invested in houses and lots it is continually rising in value.

house, built for the purpose, 175 feet long by 65 feet wide, capable of holding 200,000 volumes. The transfer of over 90,000 books, pamphlets, etc., was completed in a week. The building contained an auditorium in which up to the year 1892-42 lectures had been given to audiences varying from 220 to 550 persons, under the auspices of an association that had been formed with the name the Newberry Library Center for University Extension. In the same year the library, then managed by a single surviving trustee, was incorporated by the State under the name of the Newberry Library, and the trustee mentioned nominated a board of 13 trustees that had the power to elect its own president. Eleven of these first trustees or directors still retain their office. They are all men of wealth and prominence in the city, all are at the head of great affairs, some of them of international reputation. At the end of 1893 the new library building was ready, the transfer of over 150,000 books, pamphlets, etc., being completed in ten days.

The general plan for the building was already settled upon in 1888, as follows: It was to provide sufficient room to meet the demands of at least twenty-five years and to be so constructed that additions to the original plan could be built from time to time; it must avoid "the confessed errors of the conventional style, it must have the equipment of what is in the highest sense an educational institution an audience room, reading rooms, study rooms, and every arrangement that would make the resources of the library available to those seeking its treasures. It must have also the conveniences for administration, for study, and for the storage of books, which the concurrent experience of modern times demands." This fine problem, conceived according to the ideas of W. F. Poole, was in 1888 confided to the architect, Henry Ives Cobb. In 1889 the site was selected, about one and a half acres, in a small park, midway between Lake and Lincoln parks, not far from the shore of the lake, in a region comparatively free from smoke and near a great artery of travel with an electric railway. The building, begun in 1890, required an expenditure of over $500,000, which was defrayed from the accumulated interest and a part of the capital. The great structure is three-storied,[a] built of pink Milford, Connecticut, granite and presents an imposing as well as a tasteful appearance, especially in summer, under the high old trees of Walton Place. The present structure, however, is only a third of the contemplated one, which is to form a great quadrangle with a court in the center. Internal convenience to a certain extent has been sacrificed to architectural beauty. The basement is 10 feet high, the first floor 20 feet, the second and third floors 26 feet each, and the fourth floor

[a] In America it is called five-storied, as the basement and ground floor are each counted as a story, but often, also, as in this case, the ground floor is counted as the first story and the basement not included in the enumeration of stories.

15 feet. These heights so greatly exceed the heights of the book stacks, which are 7 feet 6 inches high, and which can be used without ladders, that a large free space remains above them, and the books are also lighted laterally from above. This has been done to give them "light and breathing space," but I am not aware that books suffer even in closed cases, and it contradicts the principles of modern library arrangement, according to which the books should be compressed into as narrow a space as possible, which, owing to the rapid increase of books in our prolific times, is the only possible method of preventing a too wide extension of the building. For this reason stacks are piled directly on stacks with hardly any free space between. Sufficient air

FIG. 47.—Newberry Library. Principal entrance.

for "breathing" is afforded by good ventilation, and the electric light to-day affords means of temporary illumination of the darkest corners, while the daylight, bleaching everything that it falls upon, can not be considered in any case as the most desirable. The book stacks are 10 inches deep.

In March, 1901, there were in the library 229,364 books, pamphlets (71,859), maps, manuscripts, etchings, and autographs (of which 56 per cent were in languages other than English), an average for the fourteen years of 16,000 numbers a year, so that at the end of 1901 there will be almost one-quarter of a million. The present building has room for 900,000; with the prospective later building there would

be room for 3,000,000, which, at the present rate of increase, would suffice for two hundred years, but with the modern arrangement of the book stacks, like those in the Congressional Library at Washington, for example, the building would certainly hold double that number, if not many more. The Newberry Library has therefore a chance for unchecked development in this direction.

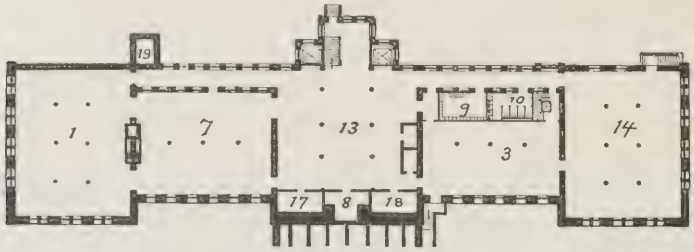

FIG. 48.—Newberry Library. Plan of basement.

1, duplicates (56 by 68 feet); 3, engine room (50 by 66 feet); 7, hall; 8, vault; 9, cloak room; 10, men's closet; 13, anteroom (36 by 66 feet); 14, storeroom (56 by 68 feet); 17 and 18, closets; 19, shaft.

The floor plans shown in figs. 48–52 give, with the legends, an idea of the arrangement of the rooms. Perhaps it would have been more judicious to have avoided the running of a corridor along the inner wall of the building, as it cuts off the light to the book rooms from this side and, besides, makes the access more difficult, but the halls, with their absolutely plain light decoration in greenish walls and white ceilings, and the antehalls, decorated with paintings and busts, make an excellent, charming, and pleasing impression, and they should undoubtedly be considered as very successful. The first story has a marble floor while the others are floored with reddish brown, unglazed,

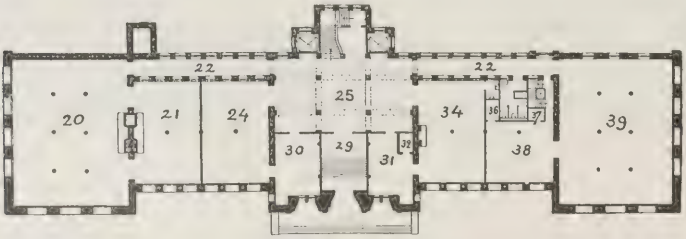

FIG. 49.—Newberry Library. Plan of first floor.

20 and 21, medicine; 22, corridor; 24, museum (33 by 52 feet); 25, hall; 29, vestibule; 30, check room (23 by 33 feet); 31, office (23 by 33 feet); 32, vault; 34, board room (33 by 50 feet); 36 and 37, closets; 38, chief librarian; 39, catalogue division.

encaustic tiles, which are made in Ohio and are half an inch thick; running carpets laid loose upon these present a somewhat unfinished appearance. The hard inelastic floors are very fatiguing for walking and standing, as is always the case in museums with uncovered stone floors. They should be covered with linoleum or corcacin. Rooms closed off for the employees are not provided. They sit in the large

halls where they are not allowed to work unmolested. The machines and ventilators are set up in the basement, whereby injurious tremors and disturbing noises are occasioned in the building. The electric light is furnished by the Edison Company. The ventilation was at first so arranged that no air could enter through the windows, which were tightly screwed down, it being forced into the building already washed and purified. However, one "couldn't breathe there," so it is

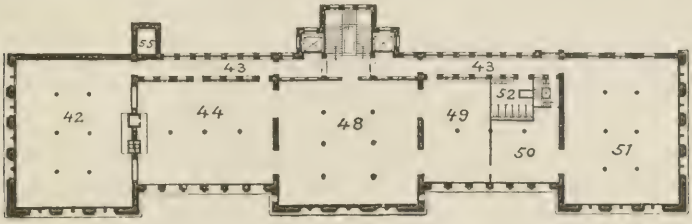

FIG. 50.—Newberry Library. Plan of second floor.

42, history (56 by 68 feet); 43, corridor; 44, philosophy (50 by 66 feet); 48, large reading room (59 by 68 feet); 49, bound periodicals (26 by 50 feet); 50, annex to art and literature (30 by 33 feet); 51, art and literature (56 by 68 feet); 52, women's closet; 55, shaft.

now ventilated by opening the windows, which have been altered for the purpose. The apparatus is either not rightly set up or not properly run, for similar ones are working satisfactorily in the Congressional Library at Washington and elsewhere. I shall speak more fully of this important subject when I treat of the public library (see p. 473). While the books could, with the ventilation that was designed, be kept free from dust or nearly so, now they are soiled without hindrance or require a greater expenditure for cleaning, and although the

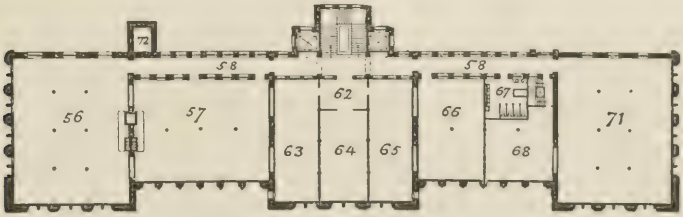

FIG. 51.—Newberry Library. Plan of third floor.

56, "Friday Club" (56 by 68 feet); 57, geneaology, music (50 by 62 feet); 58, corridor; 62, anteroom; 63 and 65, lecture rooms; 66, empty (33 by 50 feet); 67, men's closet; 68, lunch room; 71, natural sciences (56 by 68 feet); 72, shaft.

situation of the Newberry Library is not so unfavorable for soot and dust as that of the Crerar and public libraries, these bad conditions are notably present.

The building itself was constructed throughout in a fireproof manner, with nothing combustible except the window frames and doors. Clumsy wooden book stacks have, however, been installed, although almost everywhere these have in recent times given place to iron ones,

which are more elegant and in every respect to be preferred, as I have mentioned on previous pages and shall mention again. Wooden cases were chosen "because iron rusts in the damp climate of Chicago, because it is cold to the hand and is ugly." That iron easily rusts in Chicago is shown by the fact that in midsummer a pair of steel scissors, if not cleaned daily, soon becomes covered with a coating of rust, exactly as in the moist heat of the Tropics, but if the iron is suitably covered with a coat of varnish it does not rust, as is clearly shown by the examples of iron work in John Crerar Library and the public library in Chicago. The other objections made to the use of iron are, if possible, still less tenable. The other furniture is also made of wood, and not of iron, as in the building of the historical society.

A very remarkable peculiarity of the installation of the Newberry Library, is that each principal science is assigned a room by itself, with facilities for reading, so that any one who wishes to read on a subject can go at once to the division relating to it, get his book very quickly and proceed to work. This is certainly, in many cases, a great advan-

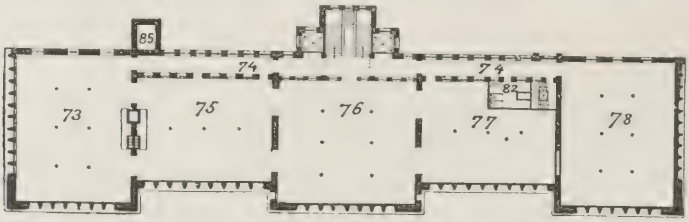

FIG. 52—Newberry Library. Plan of fourth floor.

73, duplicates of the general library (56 by 72 feet); 74, corridor; 75, empty (50 by 62 feet); 76, empty (59 by 68 feet); 77, empty (72 by 62 feet); 78, bindery (56 by 72 feet); 82, women's closet; 85, shaft.

tage, but often the division in which the book is to be sought is not known, and related subjects may sometimes be so distributed in various divisions that complications can not be avoided. For earnest students, well acquainted with the library, the arrangement is certainly of the very greatest use. Under this arrangement, besides the principal reading room with 100 places, in the second story, there are two reading rooms (medicine), with 32 places, each in the first story, 3 in second story (philosophy, history, art, and literature), with a total of 104 places, and two in the third story (genealogy and music, natural sciences), each with 40 places, making a grand total of 316 places.

As already briefly mentioned, under the John Crerar Library, the Newberry Library principally confines itself to certain classes of subjects, and therefore sold to the former institution, in 1896, a part of its scientific stock, namely, 6,331 volumes and 1,483 pamphlets, for $16,000. The Newberry Library has the following 6 divisions: Medicine, bibliography, history, philosophy, art and literature, science, and it is strongest on the subjects of medicine, bibliography, American local history, genealogy, music, and in periodicals and papers of societies.

On the first floor is the division of medicine (20, 21), with a special room named after Dr. N. Senn, professor of surgery in Rush Medical College in Chicago, who, three days after the library moved into its new building, promised a great part of his medical books, on the ground that it was a fireproof structure, and who also did much afterwards for the Newberry Library. He has also bought and presented the library of E. du Bois-Reymond, comprising 10,200 volumes and pamphlets,[a] and that of Surg. W. B. Baum, of Göttingen. The Senn collection by itself embraces 23,400 numbers. The division of medicine comprised in May, 1901, 33,972 books and 27,583 pamphlets, among which were 459 periodicals. It will therefore compare with the largest medical libraries in New York and Philadelphia. The medical library of the United States Army Medical Museum in Washington has 352,000 books and pamphlets and contains 1,500 medical journals. The nucleus of the medical portion of the Newberry Library was formed by a stock of 17,000 volumes and pamphlets, which had been deposited by 4 medical societies of Chicago in the public library, and were transferred from thence in 1890. There is besides this, in the first story, bibliography (39), which is represented best; office rooms (31, 34, 38), and a museum (24). This museum held in May, 1901, 153 manuscripts,[b] 315 incunabula, 212 volumes, specimens of artistic book bindings, 53 various other book bindings, 96 illustrated manuscripts from the twelfth to the sixteenth centuries, 113 Aldines, 97 Elzevirs, 27 Estiennes, Giuntas, etc., 150 Americana in first and rare editions, autograph copies and éditions de luxe,[c] and 213 various volumes for showing methods of illustration and of modern typography all provided with descriptive labels. The collection of fine bindings extends from Maioli (1549) and the Groliers (1550–1565) to the Frenchmen Bouzonnet-Trautz and the Englishman Bedford, and others (nineteenth century). From the sixteenth century there are 25 examples, from the

[a] I found in this, papers from my own pen, which I had sent to him, my former teacher, out of respect.

[b] The oldest is a Greek manuscript of the evangelists, from the twelfth century, that E. J. Goodspeed has described in the *American Journal of Theology*, 1899.

[c] American history has been especially kept in view in the Newberry Library from the beginning, and in 1895 it came into the possession of a collection of 5,000 volumes relating to the earliest times, which had been collected by one of the trustees, E. E. Ayer. At present a thorough descriptive catalogue is being prepared of the entire 7,000 works of rare Americana, which contain a great deal on the North American Indians, and also rare, early maps of the American Continent. On this catalogue there are working, at the expense of Mr. Ayer, about 10 specialists of rank in the United States, the library itself, however, assuming the conduct of the matter and the bibliographical arrangement of the entire material. It has also drawn up a comprehensive scheme for the coworkers, by which they proceed according to common points of view. This very comprehensive critical catalogue promises to be a work of eminent bibliographic significance. It is fortunate in obtaining the special support of the gentlemen mentioned.

seventeenth 14, from the eighteenth 22, and from the nineteenth 109 English, 187 French, and 40 various. All are chronologically arranged, so that they can be studied according to periods, countries, and individuals. The walls of the museum are, like the antehalls, decorated with pictures and busts. As early as 1888, the American painter, G. P. A. Healy, living in Paris, presented a collection of nearly 50 oil portraits, painted by himself since 1841, among which are portraits of Lincoln, Grant, Sherman, Sheridan, the founder Newberry, and the painter himself; of busts there are, in the same place, Dante, Shakespeare, Newberry, and Henry Clay. In the antehalls there are busts of Blaine, Thiers, Guizot, Lesseps, Liszt, Stanley, and others, as well as reliefs of Demosthenes, Shakespeare, Wagner, Händel, and Mendelssohn, and also three high reliefs by J. Gelert, each 13 feet long by 5 feet wide, representing La Salle's expedition through Illinois, 1680, Fort Dearborn in 1812, and a scriptorium—Benedictine monks working on manuscripts, 1456. All these constitute the beginning of an art collection whose special advancement will be deferred to a future time.

In the second story is a large reading room (48) with 100 seats, where there are immediately accessible to the public 340 volumes of general reference works, encyclopedias, dictionaries, etc.; 801 volumes of current periodicals and papers of societies, 94 Rudolph indexer books, with shelf catalogues for philosophy, sociology, and religion, which subjects are to be found in the neighboring hall, No. 44; 133 Rudolph indexer books, with author catalogues for general works, and finally, a map case, with 10 maps on rollers. Nearby (49) are periodicals. In 1900 there were 1,260 periodicals taken, among which, as already mentioned, were 459 on medical subjects, the others being distributed, by nationalities, as follows: 569 American, 246 German,[a] 215 English, 126 French, 37 Italian, 12 Belgian, 11 Swedish, 8 Canadian, 7 Swiss, 6 Dutch, 5 Spanish, 3 each of Norwegian, Danish, Russian, Japanese, 2 each of Chinese and Bohemian, and 1 each of Mexican and North American Indian. Further, history (42), with subsection of history, biography and genealogy, geography and travels, antiquities, and manners and customs; also philosophy (44), with the subsections philosophy and religion, sociology,[b] and instruction. I will mention a collection of 88 rare old Bibles from 1476 on, as well as an example of the 16mo. "Caxton" Bible of 1,052 pages, which on June 30, 1877, was printed within twelve hours at Oxford, in an edition of only 100 copies, as well as finely bound in London.[c] There is also a large and

[a] Not only is German well represented in the periodicals, it also plays a prominent part in the books, both in the Newberry and the John Crerar libraries.

[b] Sociology is in fact also represented in the John Crerar Library, but in this case, as well as in some others, an exception has been made.

[c] See Report of the Newberry Library, January 5, 1880, pp. 7 and 8.

rare collection of American and English hymn books. Finally, art and humanistic sciences (50, 51), with subsections of art, literature, and languages.[a] I will mention 324 lexicons in "almost all languages."

In the third story is the department of science (71), with subsections of natural science, Congressional documents, bound newspaper files, and special collections. The union of such a mixture under a department of science is not exactly happy. I will mention as specialties 1,200 volumes on China, 1,882 numbers on fishes, fish culture and angling, Egyptian and sporting collections. There is also found in the third story genealogy, and the musical library (57), with scores of the great composers, works on the history and theory of music, as well as on instruments, together with critical papers, journals, biographies; also lexicons and cyclopedias in "all" languages, and finally, works on the early Greek music and the early Italian writers. The principal item of interest is the musical collection of Count Pio Resse in Florence, which was bought in 1888. Recently the well-known American musician, Theodore Thomas, gave to this institution his great musical library. Finally, there are in the third story three lecture rooms (63–65) that hold 100 persons each, and a hall (56) which is temporarily assigned to the Friday Club, the most exclusive literary and social woman's club in Chicago.

In the fourth story is the well-appointed bookbindery (78) everything is bound in the building. The rest of the rooms, except one for duplicates (73), are vacant.

On either side of the principal stairway there is a passenger elevator from the basement to the fourth story, besides a book elevator at another place, as shown in the plans, figs. 48–52.

The installation and marking of the books is done according to Cutter's seventh system[b] with some modifications. Every section has the Cutter letters and numbers and to this is added an author's number according to a special list of the Newberry Library. The books stand in the order of their numbers, as in the Dewey decimal system.

The method of cataloguing of this library is quite peculiar and extremely ingenious, and is according to the system invented by the assistant librarian, A. J. Rudolph, a Hungarian, who from 1879 to 1894 was assistant librarian in the San Francisco Free Public Library. Fig. 53 shows the Rudolph continuous indexer with its glass cover and

[a] In June, 1901, the Newberry Library purchased the well-known Library of Prince Louis Lucien Bonaparte, who died in 1891. It contained 15,000 volumes on European languages. Negotiations for this lasted two years. It is a most important acquisition.

[b] C. A. Cutter, Expansive Classification, Boston, 1890, et seq. and the Expansive Classification. Transactions and Proceedings of the Second International Library Conference, London, 1897 (1898), pp. 84–88. "Expansive Classification" signifies a scheme of seven tables of classification of progressive fullness, designed to meet the needs of a library at its successive stages of growth, therefore "expansive."

door opened. The titles of the books are placed upon strips of cardboard 4 inches long and 1 to 6 inches or more in width, as may be necessary; these are shoved into a thin tin plate or frame grooved at the sides, 15 inches long and 4¼ inches wide, so that each such plate may contain 30 to 50 titles. In order to lighten the plates they are perforated with 18 holes of one-eighth inch diameter in two rows. The plates are hung with their long edges together like an endless chain, which runs over two drums and can be turned either to the right or to the left. As the strips of cardboard are easily moved new titles may be put in as needed. A case holds 1,000 frames with 30,000 to 50,000 titles which can be passed in review, either quickly or slowly at will. A Rudolph continuous indexer, with 500 frames for 15,000 to 25,000 titles, costs $150 and can be furnished by Thomas Kane & Co., 137 Wabash avenue, Chicago. A quite similar arrangement is the Rudolph indexer book, fig. 54. This is 12½ inches long and 8 inches wide and contains 10 stiff leaves for from 600 to 800 titles. It costs at the house just mentioned $5.75, and is also prepared in other lengths and thicknesses. Leaves may be shoved in and out at will, or a volume that has become too thick may be divided into two. These two methods are extensively used in the Newberry Library—1,075 Rudolph indexer books, 463 being for the genealogical catalogue, and 612 for the shelf and principal catalogue.

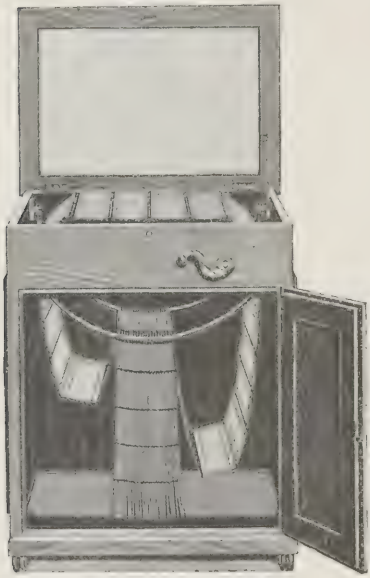

FIG. 53.—Newberry Library. Catalogue case.

A further specialty of this library is the "Rudolph pamphlet binder," bound on the same principle as the Rudolph indexer book shown in fig. 54, a practical and very tasteful although somewhat expensive way of binding a series of pamphlets together. A cheaper and good way of binding single pamphlets is afforded by the "Newberry binder," a simple cover of enameled cardboard with a linen back, rather neatly made up.

The cards for the indexer are manifolded upon the typewriter, but if many are required, they are now multiplied by means of Röntgen rays, according to a method invented by Mr. Rudolph but not yet published.[a] The titles are written, one after the other, upon sheets

[a] Mr. Rudolph in this way manifolds both print and illustrations by means of the Röntgen rays. He also uses a device, as simple as it is effective, for splitting apart leaves that are printed or illustrated on both sides, in case it is desired to use both

by the typewriter, pasted upon cardboard, and then cut apart to slip into the indexer.

All that can be done by the bookbinder, like the mounting of cards, the preparation of the Rudolph indexer books and the covers for the pamphlets, the pasting and cutting of strips for the indexer, repairs, etc., is done in the bindery of the library. All books are stitched with from four to seven threads which are often of silk, the backs are covered with binder's gauze and provided with linen guards stitched on. All plates are attached to muslin guards, much-used volumes have parchment corners, and all are gilded on the upper edge. All parts of yet incomplete volumes of journals, and works issued in parts, are temporarily bound in Rudolph binders. The cover of one of these binders costs the library 30 cents, and the appliances for holding each pamphlet, 10 cents, so the cost of a volume of five pamphlets would be 80 cents, certainly a relatively heavy expense, but such a volume is extremely solid and very elegant. If a pamphlet is to be bound by itself, the simple Newberry binder is used, which costs the library 4½ cents. The production of the Rudolph indexer books costs the library, for the size 12½ by 10 inches, with 10 stiff leaves, or 19 by 10 inches with 15 flexible leaves, $2.20 each.

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sides of the same leaf. A further very remarkable manifolding process in blueprint is used by Mr. Rudolph for the formation of catalogues. For instance, the Newberry Library in 1899 prepared 10 copies of a folio volume of 500 pages, which bears the title: "British Museum. Catalogue of Printed Books. Accessions, January, 1880, to March, 1899. Academies, with an Index." It is an alphabetically arranged register, comprising some 5,000 titles (with an index of about 3,000 entries) of accessions concerning "Academies" acquired by the British Museum from 1880 to 1899; these titles were contained in 446 single publications of the British Museum, so that it was difficult to find anything in them. They were cut apart, arranged in alphabetical order, and manifolded by blueprinting, which is very quickly done and very cheap. A page of 25 titles costs 4 cents exclusive of labor, a volume of 500 pages therefore costs $20 a copy. It was contemplated to combine in 40 such volumes, alphabetically arranged, the 900,000 titles of new accessions to the British Museum from 1880 to 1899, but this was stopped after the first volume, because the British Museum had, in the meantime, the prospect of a more speedy publication of its supplementary catalogue of printed books. The method employed by the Newberry Library is, however, so remarkable and promising that I did not wish to leave it unmentioned. Mr. Rudolph had the great kindness to present me with a copy of the 10 that had been produced, as well as to provide me with examples of the various stages of the work, which I will be glad to show to any who are interested. On the method itself he has published an article in the *Library Journal*, XXIV, 1899, pp. 102–105, "The Blueprint Process for Printing Catalogues." I will further say that the leaves of the catalogue I have mentioned have blueprinting on both sides, but which is only apparently effected by pasting together, back to back, two very thin leaves printed only on one side. Blueprinting can only be done on one side, and the originals, too, must not bear print upon the back. Since this is the case with 200 of the first leaves of the British Museum Catalogue just referred to, which later has been published, printed on only one side, it has been necessary, before their reproduction by blueprint, to split them apart, which for this purpose has also been accomplished. Mr. Rudolph's ingenuity has been successful in overcoming all difficulties.

The following catalogues are kept:

1. Two copies of an *author's catalogue* (exclusive of medicine), one of which is upon cards for use of employees, and the other in 133 Rudolph indexer books for the public in the large reading room (48) of the second story.

2. A *general dictionary catalogue* (exclusive of medicine) in Rudolph continuous indexers and in Rudolph indexer books for the public in the large reading room. In this, therefore, are found authors, titles, subjects, and references arranged in a single alphabetical series. This catalogue contains 450,000 to 500,000 entries and when complete will fill 10 Rudolph continuous indexers and 500 Rudolph indexer books. For practical well-considered reasons, which I have no space to enter into here, all of the strips which have 10 or more typewritten lines are arranged in the books, and all shorter ones in the indexer.

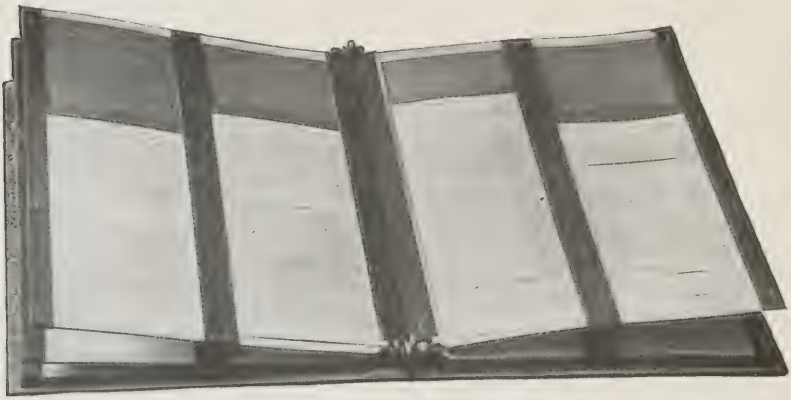


FIG. 54.—Newberry Library. Catalogue in book form (Rudolph index book).

3. Two copies of a *shelf catalogue*, according to the Cutter system—that is, a subject catalogue of all independent works, with exception of those relating to medicine, in 392 Rudolph indexer books—one copy for the employees, and one distributed through the various divisions of the library for the public.

4. *Catalogue of the division of medicine.*—(*a*) A dictionary catalogue on 17,800 cards—authors, titles, subjects, and references in one alphabet; (*b*) A dictionary catalogue of the Senn Library, on 8,200 cards; (*c*) An author's catalogue of all pamphlets, on 13,000 cards; (*d*) An author's catalogue of all pamphlets of the Senn Library, on 14,000 cards; (*e*) A shelf catalogue of all medical books, on 7,000 cards; (*f*) A catalogue of periodicals, on 2,000 cards. There are therefore 62,000 cards of the division of medicine for the use of the public.

5. A *subject card-catalogue of the museum collection* with all possible details of data, made in 5 copies, each having over 3,000 cards, placed in various parts of the library where it can be of use to the public.

6. A *genealogical index* of American families, with over 500,000 entries, which contain far more than a million references, in 463 Rudolph indexer books. This very comprehensive catalogue owes its origin to the circumstance that everywhere in the United States people are very much given to genealogical researches, everyone seeming eager to show that his ancestors belong to the early colonists, whose footsteps leading from the ancestral home are traced out with the greatest zeal; therefore all sorts of family and local histories have been purchased which could be procured in America, and the index in question is almost an index for the existing American, and for many English, family records. It includes over 200,000 families with their branches from the year 1565 on to the present time. The catalogue was begun in 1897. Four persons work on it uninterruptedly, and it is to be printed. There are, to be sure, printed indices of the kind, such as those of Whitmore and Durrie (1895), but the former contains only 12 notices under Smith, the latter only 196, while the Newberry index contains 976. A more detailed description of this undertaking is found in the *Library Journal*, XXIV, 1899, pages 53 to 55.

The library is open from 9 a. m. to 10 p. m.

Number of readers and number of books and periodicals used in the Newberry Library, 1895 to 1900.

Year.	Number of readers.	Men.	Women.	Books used.	Periodicals used.
1895	96,932	71,759	25,173	336,676	61,810
1896	104,353	76,670	27,683	271,394	58,987
1897	105,929	93,035	12,894	201,749	71,198
1898	82,800	55,684	27,116	130,620	83,360
1899	76,368	49,651	26,717	124,131	.....
1900	76,341	51,294	25,047	126,612	.....

These show relatively large variations, together with a general decreasing number of readers and a corresponding decrease in use, but the figures are nearly constant in the last three years. Compared with the John Crerar Library the relatively large attendance of women is striking, a difference which may be owing to the departments kept up by the Newberry Library—art, literature, music—for "popular" books are hardly kept. During my visit I saw a couple of quite young girls, still children, working there, and when I asked what they were doing, was told they were probably reading up for a school task that had been set them for home work. I mention this because it is so entirely contrary to our German practice, for if such tendencies should occur at all we would, though mistakenly, certainly curb them.

No lunches may be eaten in the library rooms, but at a definite time a room (68) is open for this purpose.

In the three lecture halls of the third story lectures are given by professors of the University of Chicago (see also, p. 460).

The number of employees is 53, as follows: 1 librarian, 1 assistant librarian, 21 assistants and cataloguers, 7 pages, 3 clerks, 9 bookbinders, 6 attendants, 1 engineer, 2 checkers, 2 watchmen. As far as one can judge from the annual reports, which are brief and indefinite, the library had spent up to the close of 1899, $391,843 for books, periodicals, and fittings; about $340,000 for purposes of administration that is, for fourteen years about an annual average of $28,000 for books, etc., and $24,000 for administration, there being an annual average increase of about 17,000 numbers, about one-third of which, however, were gifts; these in 1900 were 3,675 numbers. In 1900 the income from the Newberry bequest—and no other income is available[a]—amounted approximately to $108,000, of which about $31,000 was used for salaries, about $10,000 for books, about $1,200 for heating and lighting, about $4,800 for bookbinding, including that of the catalogues, about $35,000 for repairs, etc., to the houses owned by the library, for insurance, postage, freight, printing, etc. The remainder of over $25,000 is probably held in reserve, as there is no information concerning it.

The first librarian, Doctor Poole, died in 1894, and in his place was appointed J. V. Cheney, who since 1887 had been head librarian of the San Francisco Public Library, from which he brought to Chicago A. J. Rudolph, his right-hand man, and here introduced with him the Rudolph methods of cataloguing.[b]

The library has thus far published nothing except short annual reports.

Only quite exceptionally are books allowed to be taken from the building. They are then sent to a library that is nearer to the scholars who may require them, such as the University of Chicago, the Field Columbian Museum, the Northwestern University at Evanston, etc. The question as to whether a reference or a circulating library is the most useful form is well worthy of investigation; there must certainly

[a] The city levies no taxes on the library itself, though it does on the buildings, from which the institution derives a great portion of its income, and this tax amounts to over $25,000 annually. This seems astonishing when the public utility of the Newberry Library is taken into account, but, as with us, in the matter of taxes all generous feelings are abandoned. For example, the Royal Dresden museums, which are exclusively kept up by the State, must pay taxes on articles imported from foreign countries, only objects for the collections themselves being free; neither do they enjoy free postage, as is the case with all university institutes and many similar museums in other German States.

[b] Cheney and Rudolph published in San Francisco, among other things, a very fine and original catalogue: San Francisco Free Public Library. Classified English Prose Fiction, including Translation and Juvenile Works, with Notes and Index to Subject-references. No. 6, 1891. viii+306 pp. Lex. 8vo. Mr. Rudolph conceived in San Francisco his original indexer, and it was first put in operation there.

CHICAGO PUBLIC LIBRARY.

be many local conditions which bear upon the matter. In our small German university cities, for example, where learned men use the books for exhaustive study, and the same books are rarely wanted by different persons at the same time, and where besides there is hardly any outside public that uses the library, a reference library is certainly not to be preferred to the lending library system now in use. But in cities where a great, general public has need for books, it appears to me that the lending principle adopted by us is less called for, but certainly in this case such means ought to be adopted as obtained in the American reference libraries. The libraries must be opened to every one from morning until evening without onerous conditions, and sufficient opportunity must be afforded for undisturbed reading. The catalogue must be, as there, made practical and accessible, the books must be placed according to an easily intelligible system, access must be had to the bookshelves; above all there must be employees who are exclusively at the service of the public and make it their principal business to attend to readers arrangements, in short, which, with some exceptions, we are not at all acquainted with in Germany and do not even anticipate.

The Newberry and the John Crerar libraries are a noble pair, twin children of civic patriotism. In spite of their being a mile and a quarter distant from each other they may be considered as a unit, since their field of work is more or less limited with regard to each other. Chicago has in them, a beautiful, excellently arranged, most freely accessible, scientific, public reference library, in two separate buildings, already comprising 325,000 numbers,[a] and the total collection of the two libraries will, within twenty-five years, at the present rate of increase of 27,000 numbers a year, amount to 1,000,000. The Berlin library has a round million, the Paris library 3,000,000, and the London 4,000,000 to 5,000,000 numbers. Chicago, however, loves to make unexpected leaps in its development, and who knows how quickly fortune may confound such a calculation. The noble contest between the Newberry Library and the John Crerar Library will certainly produce the most elaborate results.

15. CHICAGO PUBLIC LIBRARY.

The idea of a public library, conceived by Benjamin Franklin in 1732, has received a most magnificent development in the United States, while in Germany the slight beginnings that have been made are hardly worth mentioning. "America has taken the lead in developing the usefulness of public libraries," said Thomas Greenwood in 1894, on page 524 of the fourth edition of his monograph entitled Public

[a] The Public Library of Chicago, which is quite near the John Crerar Library, has 322,000 numbers; the three libraries together, therefore, have nearly 650,000.

Libraries: A History of the Movement and a Manual for the Organization and Management of Rate-supported Libraries (598 pp., London). But since then the rise of the public libraries in the United States has been even more extraordinary, and as a crowning achievement of the entire movement the public libraries of Boston and Chicago bear witness, and this will soon be further exemplified in New York, as mentioned in Part I of this paper.

In 1899 there were in the United States 7,184 public libraries, with 35,000,000 books.[a] Each village, as one may say, possesses one,[b] and their influence upon general culture is perhaps as great as that of the schools. These public libraries are maintained, some of them by the community, some by private persons, and some by both. Andrew Carnegie alone has, since 1886, founded 66 libraries, costing $8,500,000, and quite recently he has founded 65 more in New York City, at a cost of $5,200,000.[c] The Boston Public Library, with 15 branch reading rooms and 14 delivery stations, costs the city yearly $288,641, or over 50 cents each for a population of 561,000. The Chicago Public Library, with 6 branch reading rooms and 65 delivery stations, besides stations in the public schools,[d] costs the city $263,397 that is 15½ cents annually each for a population of 1,700,000. Massachusetts has most completely developed the public-library system, and it is a mark of honor on the escutcheon of the State. However, the Chicago Public Library stands foremost in the world in lending each year, without charge,

[a] N. M. Butler, Education in the United States, 1900, p. 30. According to E. I. Antrim, The latest Stage of Library Development, in the *Forum*, XXXI, p. 337, 1901, there are now 8,000 libraries, with 50,000,000 books; according to the United States Bureau of Education, No. 232 (Public, Society, and School Libraries), 1897, pp. 340 and 367, there were, in 1896, 4,026 public, society, and school libraries of 1,000 volumes and over, with 33,000,000 books and 5,500,000 pamphlets, of which there were 2 having over 500,000, 4 having over 300,000, 28 having over 100,000, 69 having over 50,000, 155 having over 25,000, 411 with over 10,000, 630 with over 5,000, 2,727 with over 1,000, and 3,167 with over 300. The number of German books in American libraries has been discussed recently by L. Triang in an interesting article in the Berliner *Tageblatt* of May 7, 1901 (Parlament's edition).

[b] Recently traveling libraries have been established for farmers living in isolated situations (see p. 400 of this paper). These go from village to village (see Antrim, *Forum*, XXXI, p. 338). In the New York parks books are lent free.

[c] Besides this he has founded 18 in Great Britain, at a cost of $720,000 (University of the State of New York, Home Education Bulletin, No. 31, May, 1900, p. 69). Further, he gave $1,660,000 for other scientific endowments (Report Commissioner of Education, 1898–99, 1900, Pt. 1, p. 1054, and *Science*, November 23, 1900, p. 816). He writes, incidentally, concerning his gift—one can not call it a princely gift, for princes have not sufficient money to do it—to the director of the Public Library in New York, Dr. J. S. Billings: "I should esteem it a rare privilege to be permitted to furnish the money as needed for the buildings, say, $5,200,000" (Bulletin, New York Public Library, V, 1901, p. 85). (Up to 1903 Mr. Carnegie had founded over 1,000 libraries and given away nearly $100,000,000. See the Chicago Sunday *Tribune*, May 17, 1903, p. 37.

[d] Compare the account of the Buffalo Public Library, p. 408.

CHICAGO PUBLIC LIBRARY.

A portion of the stairway.

1,800,000 books, and at the same time allowing to be used in the building itself more than 2,000,000 books, newspapers, and journals.

As the great fire in October, 1871, practically destroyed all libraries, both public and private, Chicago suffered from a real book famine, and the English writer, Thomas Hughes, addressed an appeal to the writers and publishers among his countrymen to provide the city

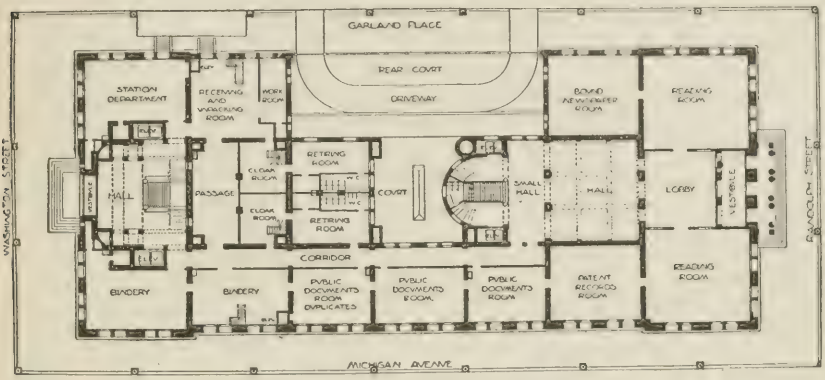


FIG. 55.—Chicago Public Library. Plan of first floor.

with books, and there quickly came in this way, from Great Britain and the rest of Europe, and from America, a total of 7,000 volumes, the nucleus of the public library which was founded in January, 1872. In January, 1873, a reading room was opened temporarily in the city hall, and in March, 1874, the library, with over 17,000 volumes, was established not far from its present location. From 1875 on it was again

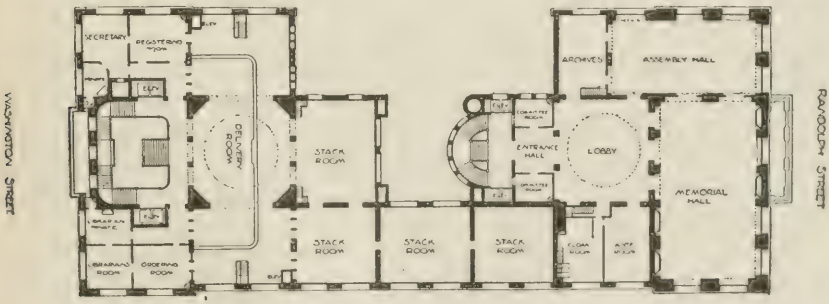


FIG. 56.—Chicago Public Library. Plan of second floor.

located in another neighboring building, until in 1886, with 120,000 volumes, it moved into the fourth story of the new City Hall, whence, in 1897, with about 230,000 books, it was transferred in six and one-half days to its present palace,[a] and fourteen days thereafter, on October 11, the anniversary of the great fire, it was opened for the use of the

[a] The moving itself cost only $657 outside of the help of the employees of the library.

public. In 1893 the corner stone of the edifice was laid, not far from the former Fort Dearborn, whose garrison was butchered by the Indians in 1812, and which was the first permanent settlement in the swamp upon which Chicago later arose. The building comprises a quadrangle between Washington and Randolph streets and Michigan avenue, its long east front facing a park along the lake. The site is immediately adjacent to the principal business center of the city, and occupies about 1¼ acres of ground, the building itself being 330 feet long, 146 feet wide, and 100 feet high above the pavement (exclusive of the balustrade). It is well orientated as to the sun, in that the free, long side faces toward the east; but opposite the remaining sides are high houses. The funds for the building were raised from 1891 to 1896 by six annual tax levies, amounting to $2,000,000, which was borne most willingly by the people of Chicago, an example of the public spirit of that city often unjustly charged with worldliness.[a]

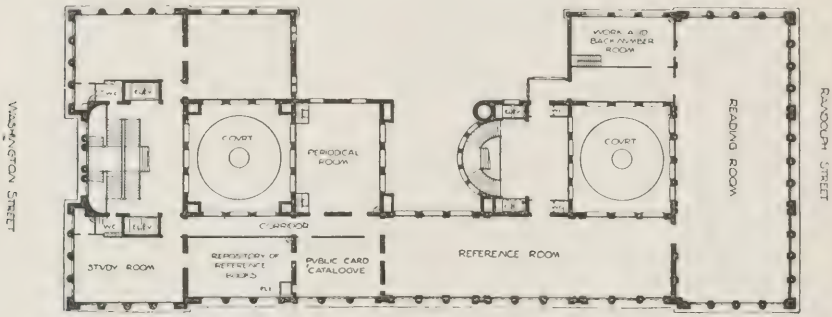


FIG. 57.—Chicago Public Library. Plan of third floor.

The disposition of the interior was more or less determined by the rights of the adjoining property holders, who stipulated that the entrance should be on the narrow side, but especially by the fact that the building must include a large memorial hall with many accessory rooms for the Grand Army of the Republic, the memorial hall in perpetuity, the accessory rooms to be devoted to this use for some 50 years.

The hands of the architects were somewhat tied by these and several other restrictions. The location within the city, where sulphurous gases arise from soft coal used, forbade frescoes and other usual kinds of decoration. As it was not wished to renounce rich external orna-

[a] Frederick Harrison, one of the most eminent English historians and writers, says, in the report of his recent visit to the United States (*Nineteenth Century*, June, 1901): "Chicago struck me as being somewhat unfairly condemned as devoted to nothing but Mammon and pork. Certainly during my visit I heard of nothing but the progress of education, university endowments, people's institutes, libraries, museums, art schools, workmen's model dwellings and farms, literary culture, and scientific foundations."

ment, but on the contrary to use this for the pleasure and refinement of the people, therefore marble and mosaic work were chosen, in the hope that it might wear as well as that which Justinian in the fifth century employed in the church of St. Sophia at Constantinople. As prime necessities it was stipulated that there must be security from fire and plenty of light. The books must also be placed centrally in order to be easily accessible, and it was further prescribed, among other things, that there should be convenient public access to the rooms, spacious book delivery and reading rooms, and such furnishing and arrangement of all the rooms that they could easily be kept clean.

C. A. Coolidge, of the firm of architects Shepley, Rutan & Coolidge, of Boston and Chicago, who also built the Art Institute, solved this great problem in a most satisfactory manner. In modern Europe I would not know where to find anything similar in this line; the new German library buildings certainly can not compare with it. The original estimates were not exceeded, the total cost of the building being, in round numbers, $2,125,000, including architects and builders' fees of about $112,000. It is a Renaissance structure, with Greek and Roman motives, the exterior of limestone with a base of granite, the stairway, on the southern side, like the entrance to an imperial Roman palace, or, by electric light, it appears as a fairy castle of the Arabian nights, built of white Carrara marble with mosaics of colored glass, mother-of-pearl, and shell. The halls, saloons, and rooms are lined with marble. Ten different kinds of American and European marble were used. The walls and ceilings in some cases are overdecorated and florid; simplicity would here have been preferable in my opinion. The plain structure cost about $600,000, the interior decoration about $500,000, independently of the decoration of the memorial Grand Army hall, which cost $75,000. I am quite unable, within the limits of this report, to give a description of the lavish magnificence here displayed, and must also restrict myself as to my illustrations, which would otherwise give the reader a better idea of it. I must content myself with saying that as a whole, whatever might be said of single portions, the structure is an imposing artistic creation, to which justice can not be done in a few words.[a]

The floor plans, figs. 55 to 57, show the arrangement of the rooms. The principal entrance, from Washington street, lies toward the south; the principal front, Michigan avenue, toward the east. The book stacks extend partly through three stories, there being six

[a] Descriptions of it are found, among other places, in *The Inland Architect*, supplement, January, 1898; the *Quarterly Book Review*, December, 1897; *Public Libraries*, November, 1897; *The Outlook*, October 2, 1897. It should be mentioned that nine-tenths of all the work was done in Chicago itself, certainly a testimony to the splendid ability of the industrial arts there. I have used especially the publication first cited, which is richly illustrated.

decks, one above the other. They are immediately back of the delivery room on the second story (Plate 30).

This room, 144 feet long and 53 feet wide, runs across the entire building and opens immediately upon the principal stairway, constituting with that stairway the most splendid feature of the building. It is decorated in the richest manner with marble and glass mosaics, especially in the high central cupola, which is 38 feet in diameter at its base and 11 feet high (36 feet above the floor). Perhaps nothing similar to it has been produced since the fourteenth century. At the northern end of the second story are the rooms for the veterans (memorial hall, assembly hall, etc.). There is here inserted a mezzanine story. Over this, in the third story, is the great reading room for current periodicals and newspapers (Plate 31), which, like the delivery room, runs across the entire building, together with the reference room. The reading room has 415 seats and about 100 standing places at the newspaper racks, and the reference room, including the adjoining rooms, has 225 seats;[a] the former is 36 feet high, 144 feet long, and 60 feet wide; the latter is 33 feet high, 144 feet long, and 42 feet wide. The collective area covered by all the rooms of the library, throughout all the stories, amounts to two and a half acres. At various places, as has been already mentioned for the north end of the second story, mezzanine stories are inserted, which has been ingeniously done without injury to the façade (Plate 28) by placing the floor of the mezzanine behind the crossbar of a window and covering it, at the same time painting it dark below, so that from without it is almost invisible. The arrangement and designation of the remaining rooms are shown on the ground plans. The rear court, on the western side, which is open as an entrance for carriages to Garland place, is later to be built over, so that in the place of the now open right angle which appears in the plans of the second and third stories, there will be built three stack rooms which will directly adjoin similar rooms in the first story behind the delivery room.

The vast machinery plant is placed in the basement. The public library is entirely independent, in that it supplies its own electric power, heat, and light (26 arc and over 7,000 incandescent lamps), and it also has its own water reservoir, rendering it independent of the city supply, if necessary, and sufficing for its normal wants for thirty hours. The arrangements of this underground world of machinery are admirable. Even in these regions there rules a high degree of elegance and magnificence. It is a fault, however, that the powerful engines stand in the building itself, and therefore shake it. In the evening, when they are working with their full power, there is at certain places a strong tremor not only disagreeable to feel, but very

[a] A total of a thousand persons can work at the same time in the public library.

CHICAGO PUBLIC LIBRARY.

Delivery room.

CHICAGO PUBLIC LIBRARY.

Large reading room.

injurious to the building itself, as, for example, to the mosaic floors, which already have suffered at various places.[a] If the engines must stand in the house itself, they should be isolated, as in Columbia University, already mentioned, although this would be more difficult in the swampy ground of Chicago than in the rocky region of Columbia University. Eight electric elevators serve for the incessant demands of visitors. The stairs are but little used.

The problem of a fireproof building has here been perfectly solved. In Chicago, as well as elsewhere in America, it is customary, when constructing large buildings, to first of all erect a steel framework or skeleton, which runs from top to bottom and across the building (see fig. 58), and into this frame are set the walls of brick or stone (as with us a framework of wood is filled out with stones and clay) and the building can then be carried on from above downward, instead of the opposite, since each story is independent from the others and rests on its own foundation. In the public library this has been avoided, for if in such buildings stores of combustible goods begin to burn, the steel beams bend and the whole structure falls together like a house of cards. In the public library the steel construction rests upon the walls of the building, not the reverse, and steel supporting columns are entirely avoided. The great spans between the walls are mostly bridged over with box girders, but also with plate and lattice girders between which are iron beams. The span of the box girders is 66 feet. Fig. 59 gives a representation of the steel construction of the floor. The spaces between the floor beams are filled in with large porous terra-cotta blocks. The steel beams and supporting columns are also encased with terra cotta, which makes them absolutely fireproof. The floors are laid in cement, upon which are set marble mosaics, glazed tile, or parquetry, the last, however, only in offices and workrooms, where it is covered with corcacin, to the value of about $3,500. The gang plates at the book stacks are made of hard glass or tile. The walls are wainscoted or lined with marble. Window casings and sashes, as well as book stacks, are of iron (costing about $30,000), the other furniture (costing about $66,000) and the doors are of wood. On the latticework, doors, and elsewhere much rich bronze work is used. For important documents and rarities special fireproof vaults with iron cases are provided, as shown in fig. 60.

On account of the swampy foundation of Chicago the library rests upon 2,400 piles, each 55 feet long and of 12 inches diameter, that are driven to an average depth of 75 feet below the level of the street

[a] Whether or not this is to be ascribed to the strong shaking alone I will not state positively. It is also possible there is some fault with the cement base. In any event, however, these tremors can do no good to the building. I even see that they endanger its permanence, and that ultimately an engine room will have to be built outside.

pavement, and upon them rests a double layer of beams, crossing each other at right angles, and then 23 feet of masonry, upon which the

FIG. 58.—Fisher Building, Chicago, northeast corner of Van Buren and Dearborn streets.

building stands. The portion of the basement that contains the boiler and engine room does not rest on the walls, but upon a steel foundation

supported by steel pillars and beams. The foundation cost about $164,000 and the machinery plant about $191,000. There are, among

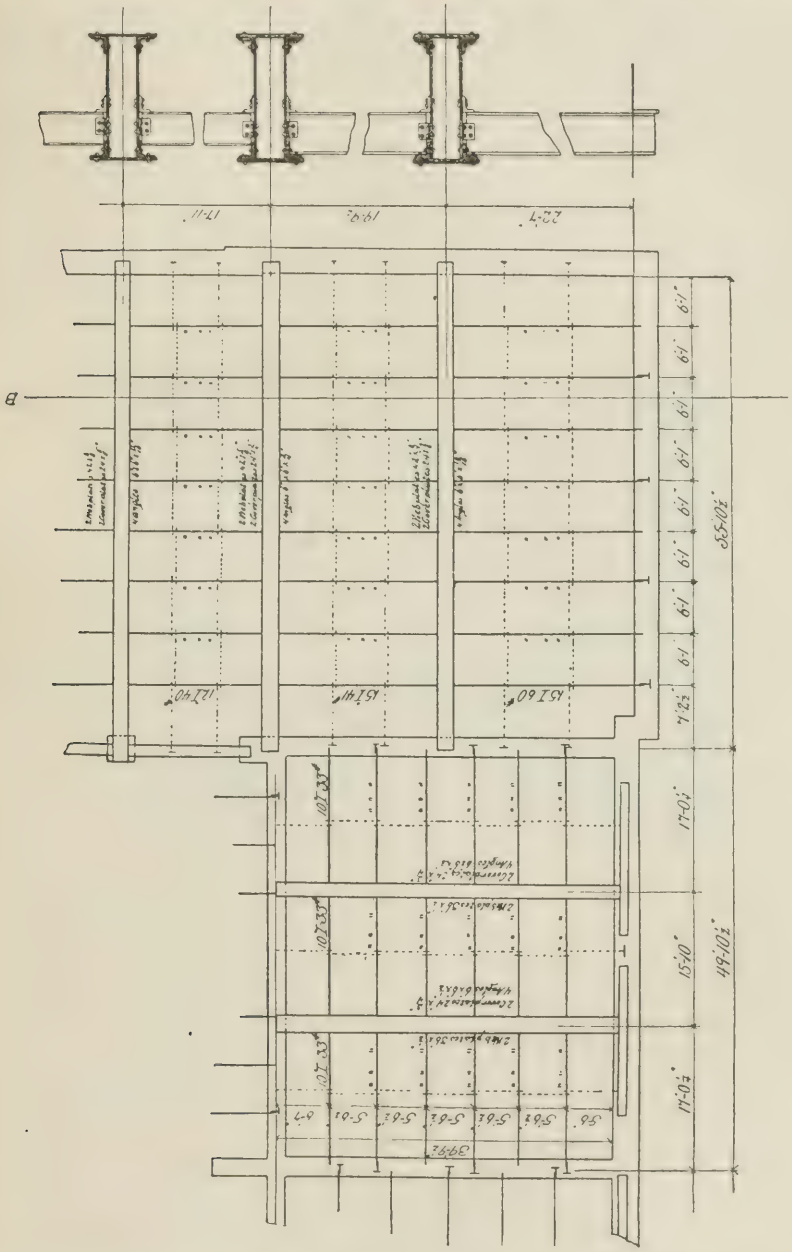


FIG. 59.—Chicago Public Library. Steel construction between the floors.

other appliances, two fire engines always ready for use, which can each throw about 700 gallons of water a minute, should necessity arise.

Long lengths of fire hose are distributed everywhere. Very ingenious and important also is the installation of the water system on the three sides of the building with houses opposite, by which, from the roof downward, a screen or veil of flowing water can be set in motion in case of fire, an arrangement that has already on one occasion practically proved its usefulness, and which is certainly worthy of imitation. The accessory stairways are of iron. The delivery room can be shut off from the adjoining book stacks by steel roller shutters. No fire is allowed except that for heating in the basement. In the book bindery and in the rooms reserved for employees at the noon hour, etc., electric heating apparatus is used. Everything, in fact, is done to reduce the danger from fire to a minimum. If one wished to be rigorously critical, it might be adversely mentioned that the furniture, such as tables,[a]

FIG. 60.—Chicago Public Library. A fireproof vault. (See p. 479.)

stools, etc., as well as doors and elevators, are of wood, although there is no real danger, as the woodwork is very massive. Notwithstanding this, the building has recently been insured for $500,000, at an annual premium of $1,000, for the special reason that the adjacent buildings to the westward are quite near. The night service consists of a watchman and engineers, the latter working in shifts of eight hours. The cleaning is for the most part done during the night, using the electric light (there is no other) as is needed.

In an equally successful manner the architects have solved the prob-

[a] The table tops are unusually massive, but have the disadvantage of warping, so I found a great number of them, on this account, put aside for repairs. In the working and office rooms some of them are, as an experiment, covered with linoleum. Iron tables with linoleum cover would certainly be preferable. There is, too, excellent iron furniture for rooms, made in America (see remarks on this subject, p. 380 et seq.).

lem of everywhere providing abundance of light. The high, broad, closely spaced windows and the court (see plans) everywhere admit so much daylight that nothing better could have deen devised. This is especially the case on the eastern and northern sides; also in the delivery room with its large windows at both ends and the glass cupola, as well as in the reading rooms frequented by the public and at the book stacks. Only a few inner rooms of the ground floor are so dark that artificial light is necessary in the daytime.

The demand for convenient access to the public rooms has also been successfully met. The delivery room of the second story, frequented daily by thousands, is conveniently reached by the magnificent stairway of the south entrance unless it is preferred to use one of the four elevators near by, while the reading rooms of the north and east sides, which likewise are daily visited by thousands, can be directly reached by four elevators, by the south stairway, or by the central stairway. It is a special and novel architectural characteristic of this library that the reading rooms are situated at the top, while elsewhere they are ordinarily placed in a central hall, at ground level, and lighted from above, an arrangement that occupies a large ground area and has, besides, many other disadvantages, as is well known to everyone from experience. For this reason the new public library in New York, as already mentioned, adopted the plan of putting the reading rooms in the third story. Besides, the rooms can be much more quickly reached by elevators than by stairways, only as in the Chicago Public Library, there must be a sufficient number at the disposal of the public. The greatest care has been given to these elevators. They are operated by electric power, therefore run quickly and noiselessly, can be easily stopped or started, and their doors open and close automatically by atmospheric pressure. They are perfect. The grill work of the elevator openings at each story is of bronze, and the elevators themselves are ornamented with much beautiful bronze work. Besides the eight elevators for the public, there are two for the internal administration and six smaller ones for transporting books to and from the stacks. The elevators cost about $21,000.

The heating is effected by a direct-indirect system with steam-heating coils for use in cold weather and hot-air blast for milder weather. It is kept up entirely by the exhaust from the engines, and its cost is therefore relatively slight. Recently the so-called smokeless coal has been used, whereby about $6,500 a year have been saved. The temperature is in some cases regulated automatically by thermostats, but usually on the spot by the opening and closing of heating flues.

Ventilation. In the basement seven fans draw out of the building 327,000 cubic yards of air an hour through gigantic sheet-iron pipes and seven others blow in 280,000 cubic yards of fresh air. This air is warmed in cold weather, washed by passing through sprays of water,

again warmed, if necessary, by passing over hot pipes, and is forced into each room near the ceiling and drawn off near the floor. It can be independently shut off or turned on for any of the rooms. At first none of the windows were arranged for opening, the plate glass being set in solid iron frames with cross-bars. By this arrangement only purified air could enter, except such as streamed in through the doors which open onto the street. This was very essential for keeping the interior of the building and the books clean; but the apparatus did not work satisfactorily. The rooms were often too hot, and consequently, in 1899, at a considerable cost, a row of windows was changed so as to be opened, and thus the entire excellently devised system was rendered useless. At the time of the very high temperature that prevailed in Chicago at the beginning of September, 1899, I found the rooms intolerably warm, especially those with an east and southeast exposure, in spite of the open windows and many electric fans placed everywhere. It could not have been warmer with the defective ventilating apparatus, some corridors and rooms being like a bake oven. Much dust came through the open windows into the beautiful building, and the noise of the street was distracting.

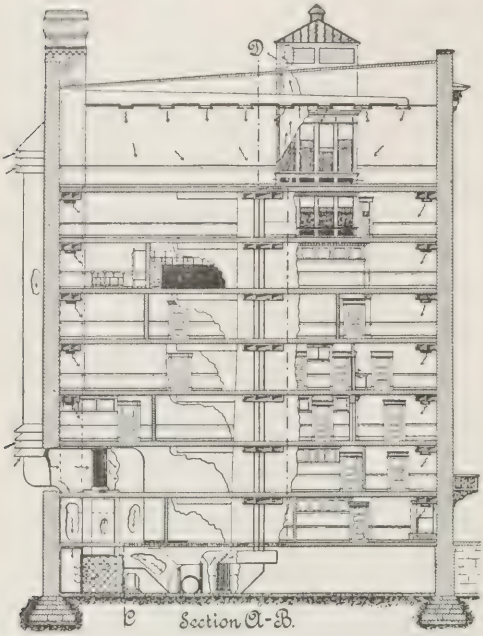


FIG. 61.—Chicago Telephone Company. Plan of ventilating plant.

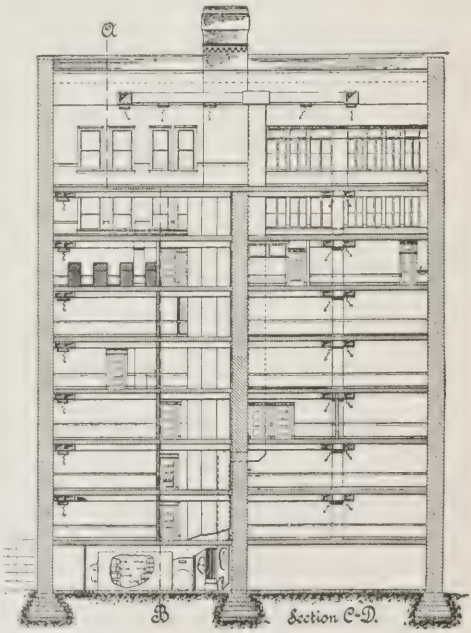


FIG. 62.—Chicago Telephone Company. Plan of ventilating plant.

As it was important for me to ascertain clearly the value of the

ventilating system. I visited the operating room of the Chicago Telephone Company in the seventh story of a building on Washington street, where a similar system has been going on for three years. It was put in because dust was injurious to the electric contact. I found there 120 women crowded closely in a relatively small room where day and night they do nothing but make and break connections, a slavery indeed.[a] The ventilation, however, had not been operating for a fortnight, as a wing to the building was under construction and the windows were open, so that the noise of the street was very annoying. I learned that the women who had complained of the ventilation system since its installation three years before, had during this fortnight when it was not working, wished for its restoration. This reminded me of the experience which I had in the Dresden Museum twenty-five years ago, when the hot water heating plant was installed there. The employees complained that they were accustomed to heating by stoves and charged their indisposition and illness to the new system of heating. It was only the novelty of the method and their own prejudice that set them against it, as in Chicago, where, however, after experience it became evident that the new arrangement was the better. It will, therefore, be retained by the telephone company. In figs. 61–64 I give the plan adopted for the installation of the apparatus, which was given me by the chief engineer of the company, who explained the matter to me with the courtesy which is everywhere shown in the United

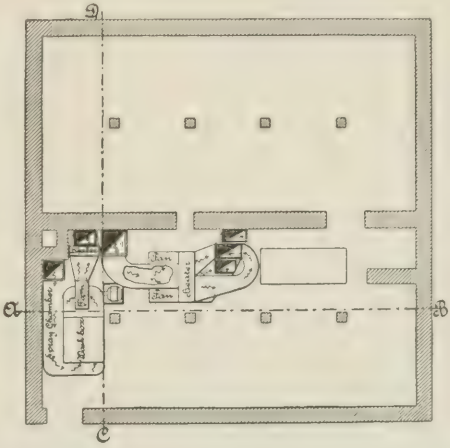


FIG. 63.—Chicago Telephone Company. Plan of ventilating plant.

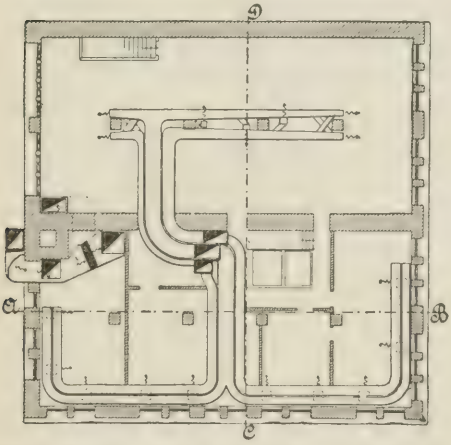


FIG. 64.—Chicago Telephone Company. Plan of ventilating plant.

[a] They receive from $30 to $65 a month.

States. In the public library it has meanwhile been recognized that the reason for the ineffective working of the apparatus lay, among other things, in the insufficient speed of the fans, and it is decided to replace the motors by more powerful ones, as well as to set up two new spray chambers. Perhaps, too, the air could not be sufficiently cooled by the existing machines, since by proper apparatus for passing it over ice it may be kept at a temperature of 18° F. lower than the external air. As I have already mentioned, in speaking of the Newberry Library, the system works excellently in the Library of Congress at Washington. Further experiments in the Chicago Public Library will, however, be important, for if the system should ultimately be perfected it may be introduced into museums in smoky cities, such as Dresden, where it would bring about an extraordinary improvement, for there is now no

FIG. 65.—Chicago Public Library. Part of iron book stack.

end to the cleaning and renovating. Some of the collections are even closed twice a year for a fortnight for thorough cleaning.

The books themselves are installed in a most complete manner. They are placed directly behind the delivery room (see Plate 30, where behind the arches two rows of book stacks may be seen), in whose immediate neighborhood are placed 75 per cent of the books in most demand, so that mechanical devices for service at the stacks, such as I expect to describe in the Washington and Boston libraries, can be dispensed with. The stacks are of iron and are made by the Art Metal Construction Company (former Fenton Metallic Manufacturing Company) in Jamestown, New York, referred to above, which firm also made the excellent repositories for the library of Columbia University in New York (see p. 371). The stacks stand with interspaces of 40 inches, and are arranged in from 3 to 6 decks, each 7 feet to 7 feet 6 inches in height. They are 1 foot 3½ inches wide and

double faced, so that a depth of 7¾ inches is provided for the books; eight or nine rows stand abreast in a room separated by a middle passage into two groups each 14 feet long. Each such stack, 13 feet 9 inches long, is divided for the purpose of fastening the shelf supports, into five sections, each 2 feet 9 inches long. The passageway is 4 feet 3 inches wide, and the side passages about 40 inches wide. The stacks in the public library are of a light blue color, covered with a lacquer which feels like velvet, so that the books can not be injured; all angles in addition are rounded. The shelves, of iron, are easily adjusted by means of grooves 1 inch apart; practical holders, adjusta-

FIG. 66.—Chicago Public Library. Series of book stacks.

ble above, prevent the books from falling down on shelves not entirely full (fig. 65). The space between the shelves is usually about 9 inches. The stacks are entirely open, so that air can circulate freely, which is considered important for the ventilation of the books. Whether experience has shown that books on open shelves are preserved better than those in closed cases is unknown to me. Around the bottom of the stacks (see fig. 66) and along the walls run ventilating slits. Fig. 66 gives a view in a middle passage in the periodical room in the third story. Fig. 67 shows an arrangement with which, by means of extensible grills, single sections can be cut off. Fig. 68 shows a room for folios (the picture represents the room for bound newspa-

pers). Repositories are here provided for folios of the largest size; the books lie upon rollers and slide from right to left, so that any injury to the binding is avoided. This is a very excellent although costly apparatus, especially used in case of valuable works upon art, in which the library is not poor, and which are much used. The wires for electric lights run inside of the book stacks in protected conduits which above are brought out into the aisles and bear the incandescent lamps (see figs. 66 to 68).

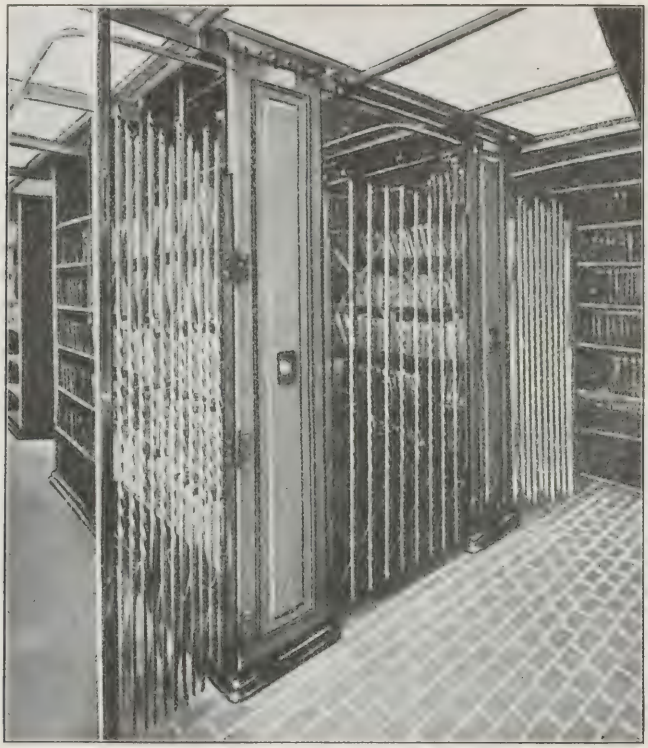


FIG. 67.—Chicago Public Library. Closable alcove.

Elevators driven by electric power carry the books between the repositories, up and down, and into the reading rooms of the third story. On the southwest side of the ground floor are the rooms from which books are sent out to the 65 delivery stations of the city. The book stacks are connected with these rooms by pneumatic tubes of 3 inches diameter, speaking tubes, and telephone, as well as by two service elevators.

The telephone system of the library is very extensive; 24 rooms can be connected with each other, and the head bureaus also, with the city system, through a common switch board placed in the central station of the building, which must in every case be called up. There are

also 29 electrically regulated clocks distributed throughout the library. The electric lighting and all other electric appliances require about 25 miles of wire.

In the year 1900–1901 (the fiscal year extends from June 1 to May 31) there were on hand 272,276 bound volumes and 49,805 unbound pamphlets, as well as over 6,000 duplicates. The following catalogues were kept up with the greatest care: (1) An accession catalogue with running numbers; (2) a shelf catalogue according to a special system founded on Cutter's classification, with letters indicating subjects and with running numbers according to which the books are arranged (the tags are pasted upon the backs); (3) an alphabetical card catalogue of authors, titles, and subjects combined (dictionary catalogue), there being two copies of this, one for the use of the employees

FIG. 68—Chicago Public Library. Book racks for folios. Each book lies by itself on rollers.

and one for the public, in the room adjoining the book room of the third story. Each catalogue is kept in a wooden case with 500 drawers[a] that hold nearly 500,000 cards; 200,000 in each are already in use. The cards for use by the public are perforated and strung on a metal rod so secured (in the well-known manner) that the user can not remove them. The catalogue for use by employees is not so confined. All the cards in use in American libraries are of a uniform size of 3 by 5 inches. In the Chicago Public Library some of the cards are written with the pen, some with the typewriter, but many are bought ready printed. Printed catalogues, which for the small sum of 3 to 15 cents, can be bought in the library itself, and in all branch stations, are prepared for the use of the public.[b]

[a] Such card catalogue cases are also made in America, out of iron, especially by the Art Metal Construction Company, of Jamestown, from which the Dresden Zoological Museum obtained a small one.

[b] In his full report Doctor Meyer gives details of the catalogues and statistics of the contents of the library, which are omitted from the present translation.

The public library contains books for home reading, reference works, periodicals, public documents, and books on the fine and decorative arts, the total in 1900 aggregating 258,498 books.

The present book stacks suffice for 300,000 volumes, but about $11,000 is now being spent in constructing additional ones that will accommodate 90,000 more, and there is room enough for stacks to accommodate 200,000 besides, but if the structure referred to above is built over the west court and the rooms now used by the Grand Army of the Republic become free to the library, the building may contain 2,000,000 volumes. There is, therefore, space available for a long period of future growth.

In the great periodical reading room of the third floor 1,030 current periodicals and newspapers are displayed.

The reference room adjoining is as unrestrictedly accessible as is the large hall. It contains, in its wall repositories, dictionaries, encyclopedias, bibliographies, handbooks, etc. (2,000 volumes in all), that the public can use directly without application at the desk. It is not possible to state how many volumes are here consulted, but it is certainly many hundreds of thousands. In 1900-1901, 121,709 persons visited the reading room and used 336,103 volumes which, at their request, were given to them from the library.

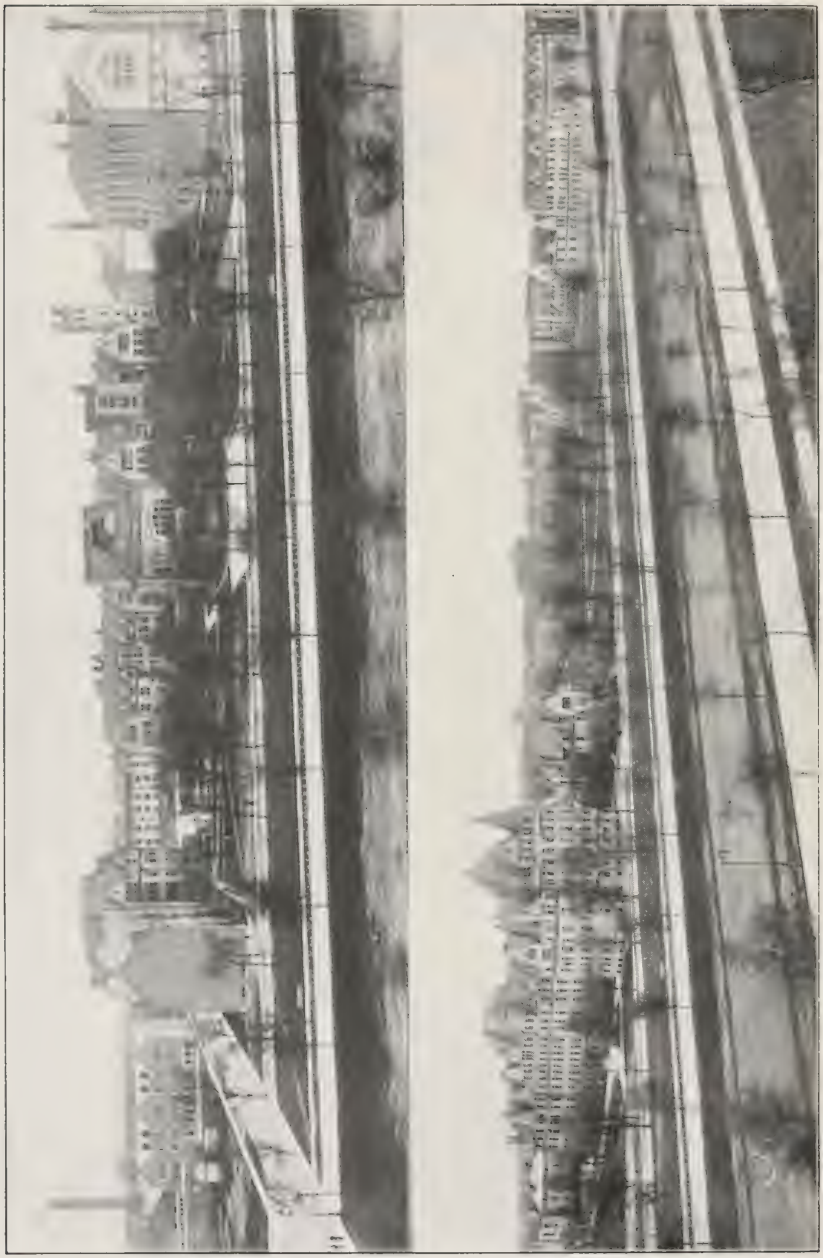
In 1900-1901, 1,772,741 books were lent to 79,605 persons, averaging 5,813 on week days, 284 on Sundays and holidays, the maximum being 10,005 on February 23, the minimum 4,424 on September 12. Sixty-six per cent of these lent books, 1,164,320, came from 65 branch stations in the city.

More than 4,000,000 volumes, including pamphlets, parts of periodicals, and newspapers, are annually used in the Chicago Public Library. In 1900–1901, 1,800,000 were lent out and 600,000 (estimated) were used in the library and its six branch reading rooms. The number of books, periodicals, and newspapers consulted or taken from the open shelves, and of which no record was taken, must be estimated at not less than 1,600,000, based on the number of daily visitors given above.

All of this will give an idea of the all-embracing activity of the public library. That so great an organization, which does so much good, can not be cheaply maintained is obvious. In 1899–1900 the cost of the maintenance, defrayed by the city, was $263,397. There was paid out for salaries in 1900–1901 the sum of about $136,000; in 1899–1900 the branch stations cost $23,717 and the fuel $8,068.

The library has 208 employees, 59 of whom are women, and include 1 librarian, 1 secretary (also treasurer), 3 assistant librarians 8 heads of departments (circulating, delivery stations, reference, binding, reading room, registry, ordering, patent department), and 110 assistants.

At the head of this powerful and admirable institution is a board of 9 directors. The mayor of Chicago annually names three of these



UNIVERSITY OF CHICAGO.

General view of the University buildings, looking from the Midway Plaisance.

directors, who serve for three years, the appointments being confirmed by the city council. The board of directors reorganizes itself yearly, chooses its president and vice-president and appoints six committees: On the library, administration, delivery stations, buildings and grounds, finance, and by-laws; the secretary of the library acts as secretary to the board. Unstinted praise is due these men, who, with the active staff of the public library, devote their energies to so great a task and solve it in so successful a manner. I am sorry that I am no longer young enough to assist in establishing a similar institution in Germany. In the public library of Chicago one learns how much we have to do in this field. Our schools may be better than those of America; of that, however, I am not in a position to judge; but the means which we furnish adults, by which they can, without expense and without difficult conditions, further educate themselves, are entirely insufficient. We need an intellectual counterpoise for the purpose of freeing men from pot-house living and women from back-stairs literature, and for this a free public library of the best type is a powerful lever.

In my account of the Chicago Public Library I have only been able to touch upon the principal matters, being obliged to omit many interesting and instructive details.

16. UNIVERSITY OF CHICAGO.

[Founded by John D. Rockefeller.]

The University of Chicago was opened in 1892. It possesses a rectangular piece of ground about 35 acres in extent, 2,075 feet long, 875 feet wide, covering six city blocks[a] in the southern part of Chicago, between Jackson and Washington parks, distant two-thirds of a mile from the former and one-fourth of a mile from the latter, on the Midway Plaisance, a strip of park that unites the two. The original plans contemplated the establishment of a great museum, but as the Field Columbian Museum arose in the near vicinity, that idea was abandoned and, instead of forming a great collection for public exhibition, it confines itself more to scientific collections for teaching purposes. Those at present provided, independent of the collections of the separate institutions, are displayed in two museums, the Walker Museum and the Haskell Oriental Museum. Both were designed, as were all the buildings of the university,[b] by Henry Ives Cobb, the architect of the

[a] Now much more, 1903.

[b] I could not give all the study to these that they deserved, and have, in the following remarks, consulted the annual registers of the university and the annual reports of the president, as well as an article by Prof. F. Starr, in *Appleton's Popular Science Monthly*, October, 1897, pp. 784–805; also taking from the latter some illustrations. During my visit to the university, as I was endeavoring to obtain some information at the office, a student heard me, constituted himself as my guide and accompanied me everywhere during the whole day. This shows the uncom-

building for the Historical Society and of the Newberry Library (see p. 459), in the English Gothic style, the material being a fine-grained, gray sandstone, the treatment being very pleasing and agreeably diversified, and, in spite of the avoidance of superfluous decoration, not monotonous.

WALKER MUSEUM.

The Walker Museum, named after the donor, is a three-storied building that cost about $130,000 and was opened in 1893. It lies with its broad sides toward the north and the south, which is unfavorable to the entire south side, for, as an excess of light thus comes from that quarter, the lighting of the cases would be improved if some of the windows were closed. It is seldom that a museum is too well

FIG. 69.—University of Chicago. Walker Museum.

lighted. It occurs here because of the narrowness of the window piers and from the circumstance that the principal hall, on the ground floor, forms an undivided room, and therefore the light falls into the relatively small hall from all four sides, thereby causing annoying reflections. The building is fireproof throughout, and is heated by steam from the university plant. The ventilation is insufficient. The cases are of wood, with broad frame work and doors that slide up and down; they are primitive, and not dust proof. A practical arrangement is used for the consultation of maps which are kept in large

monly helpful disposition which characterizes the Americans, and which I have already pointed out at a former occasion. This obliging gentleman was a geologist, a bachelor of science, H. V. Hibbard by name, and I remember with pleasure and gratitude his attentions to me, by which I was saved much time.

drawers that run in grooves screwed upon the inner side of the doors of the cases. These doors open only far enough to make right angles with the case, so that when drawn out the drawer serves as a table.

The museum contains between 400,000 and 500,000 specimens, and is open all day on week days. The collections embrace anthropology, geology, geography, mineralogy, petrography, and historical paleontology (illustration of the succession of the faunas and floras in the history of the earth), with many models, casts, maps, photographs, etc. Upon the ground floor are exhibits relating to the above-named sciences, as well as to Mexican antiquities. Upon the second floor are the collections for study (for the most part in drawers), besides work-

FIG. 70.—University of Chicago. Haskell Oriental Museum.

rooms, a library, and lecture rooms. On the third floor are the collections for study in anthropology, with instruments for measuring, maps and graphic representations relating to the aborigines, with collections from Mexico and Peru, from the pueblos of New Mexico, the cliff-dwellers of Colorado, the Moki Indians of Arizona, the Aleutes, and the northwestern coast of America, Japan, etc.

The museum is managed by the professors of the University, with a few assistants.

HASKELL ORIENTAL MUSEUM.

The Haskell Oriental Museum is dedicated by the donor to the memory of her husband. It is a three-story building, costing $100,000, and was opened in 1896. At the present time the second floor only is devoted to the museum collections, which include a biblical exhibit;

one of comparative religion; an Assyrian exhibit, consisting mostly of casts, and an Egyptian collection. The objects relating to the Japanese Shinto religion should be especially mentioned, as they are very seldom seen in other museums. The greatest space is devoted to the Egyptian collection, to which new material is constantly being added by the Chicago Society of Egyptian Research, founded in 1897. The lighting of the rooms is excellent, being more satisfactory than in the Walker Museum, as the building lies with its broad sides to the east and west. The remaining stories contain, temporarily, lecture rooms, seminary rooms, library, and the like, but they will later be used for collections. The founder established two lectureships at $20,000 for lectures on the relations of Christianity to other religions, one series of which is

FIG. 71.—University of Chicago. Kent Chemical Laboratory.

delivered annually at the university, the other delivered in alternate years in cities of India. In 1899 the subject for the first was Christianity and Buddhism in six lectures between August 6 and 22.

Because of the recent establishment of all the institutions of the university it follows that they satisfy the most modern requirements and are models of their kind. The buildings are fireproof throughout, but with wooden furniture and stair coverings, as well as wooden door and window casings, which might as well have been avoided, at least in those buildings where there is danger from fire because of the kind of work carried on therein. I must confine myself to brief notices of these several buildings, accompanied by illustrations, for if I were to treat them as fully as they deserve I should far exceed the limits set for this report.

KENT CHEMICAL LABORATORY.

The Kent Chemical Laboratory was named for the donor of the building. It cost about $240,000, and was opened in 1894. It has three stories. On the ground floor are four lecture rooms, the largest holding 300 persons, a museum, and some workrooms; in the second story there are laboratories for advanced students, and a library. In the third are laboratories for beginners. I mention, in all cases, only the principal rooms. Six private laboratories are provided for the professors and teachers. For ventilation several fans drive in air of a constant temperature below, and one fan expels above.

RYERSON PHYSICAL LABORATORY.

The Ryerson Physical Laboratory was named by the donor of the building in memory of his father. It cost $225,000 and was opened in

FIG. 72.—University of Chicago. Ryerson Physical Laboratory.

1894. It has four stories, and is of especially heavy and solid construction, in order to diminish tremors. The walls are wainscoted with marble, and the wall shelves of heavy slate on piers of masonry. In the walls and floors are a system of ducts and channels, so that pipes and wires may be laid from one part of the building to another without difficulty. The heating is automatically regulated according to the direct-indirect system. Injurious effects are produced by the engines, three dynamos, and workshops in the basement. On the ground floor are laboratories for advanced students, mechanical workshops, etc. In the west wing are rooms free from iron devoted to

researches in electricity and magnetism. On the second floor there is a large general optical and chemical laboratory, a large lecture hall, and other rooms. On the third floor is a laboratory for beginners, a lecture hall, and other rooms. Here also is provisionally established the mathematical and astronomical department of the university. The central part of the fourth floor forms a hall for experiments requiring a large space. The roof above this is flat and suitable for observation in the open air.

HULL BIOLOGICAL LABORATORIES.

The Hull laboratories (fig. 73) are four buildings, erected according to a common plan, connected partly by covered cloisters, and forming

FIG. 73.—University of Chicago. Hull biological (physiological and anatomical) laboratories.

three sides of a large court. They were given by Miss Helen Culver and named in memory of her uncle. They were opened in 1897. In the letter of presentation it was said that the whole sum of $1,000,000 should be devoted "to the increase and spread of knowledge within the field of the biological sciences," and that a portion of it should be applied for sustaining an inland experimental station and a marine laboratory and to the regular delivery of popular lectures upon the advances of science in sanitation and hygiene. It was also provided that only one-half of the sum should be used for the erection of buildings, but that the interest on the other half should be applied to the support of research, instruction, and publication. In accordance with this plan a zoological, a physiological, an anatomical, and a

botanical institute have been built, each specially adapted to its own ends, and it should be particularly mentioned that the architect has not allowed himself to sacrifice either space or light to the requirements of the Gothic style. The open side of the court is turned toward the center of the University grounds.

The *Hull Zoological Laboratory*, shown in fig. 74 on the left, has four stories, 130 feet long and 55 feet deep. In the basement there is an aquarium, vivaria, preparators' workrooms, and the like, as well as a room for paleontological material, as paleontology in the Chicago University, is distributed in a rational and progressive way among the biological sciences. On the first floor is a museum, a general biological library, and the laboratory for beginners. On the second floor are only zoological laboratories. Upon the third floor there is a laboratory for comparative anatomy and embryology and one for cellular biology, as well as single zoological workrooms. Upon the fourth floor are laboratories for bacteriology,[a] as well as rooms for paleontology.

In summer, work is also carried on at the marine biological station at Woods Hole, Massachusetts (Marine Biological Laboratory), which is allowed the pupil in reckoning his prescribed hours of work, although the station is not ranked as belonging to the Chicago University. The director of the zoological laboratory of the university is also director of the Woods Hole station, which is an hour and a half

[a] During my visit there were undertaken here extensive researches, begun in the early part of 1899, upon the water of the Mississippi, and the Illinois and its tributaries, as it was desired to discharge the sewage from Chicago by that route. Up to that time it had been discharged partly through the Chicago River into Lake Michigan, which not only changed that river into a reeking sewer but also polluted the potable water supply of the city. In spite of the fact that the lake water was pumped from the lake, 4 miles away, through subterranean channels, Chicago remained unhealthy, with frequent cases of typhoid fevers and other diseases. Now, through a canal 30 miles long, reaching as far as Lockport, a union has been effected with the Desplaines River, and through that with the Illinois and the Mississippi, and the city thus freed from noxious materials without, it is alleged, injuring the dwellers upon the other rivers, as the sewage is extraordinarily diluted by bringing the water of the lake into the canal (11,000 cubic yards a minute, which could be raised to 22,000 cubic yards). The question has even arisen whether, through this enormous withdrawal of water, the level of the Great Lakes will not become permanently lowered, so that the shipping interests, which are very active, may be injured thereby. The canal, which was finished in seven years and opened in 1900, also serves for ship transport. It is 175 to 317 feet broad, from 16 to 22 feet deep. It cost the city about $35,000,000, but this was not too high a price to pay for the benefit which it wrought. The Hull Bacteriological Laboratory has been especially adapted for this task, and has, among other things, already undertaken a great number of chemical and bacteriological researches in order to prove whether any appreciable effect will be produced by the introduction of the diluted sewage into the canal and the great river system involved.

by rail from Boston, therefore more than a twenty-four hours' journey from Chicago. It is supported by several universities of the United States and publishes, among other things, biological lectures of a more or less popular character, which are given there. The U. S. Fish Commission of Washington also has a station at Woods Hole.

The *Hull Botanical Laboratory*, shown at the right in fig. 74, has four stories, and is 112 feet long and 56 feet wide. The rooms of this building are also especially well lighted. The greenhouse is 75 feet long, 33 feet wide, and easily reached by an elevator. It affords space for growing plants under different conditions (tropical, arctic, desert, aquatic) in order to experimentally determine their influence over the organism. The temperature and moisture can be exactly controlled. Underneath, in the fourth story, are rooms chiefly for the study of plant physiology, a chemical laboratory, a workshop, and others. In

FIG. 71.—University of Chicago. Hull biological (zoological and botanical) laboratories.

the third story are studied the taxonomy and morphology of cryptogams. In the second story are the great herbarium, an excellent library, laboratories, etc., and on the ground floor the lecture rooms and the large general laboratories for beginners. Parts of the basement and of the ground floor are temporarily occupied by the printing establishment of the university.

The *Hull Physiological Laboratory*, seen in fig. 75, has four stories, is 112 feet long and 55 feet wide, and is connected with a greenhouse for the rearing of insects and plants. In the basement are a cold-storage room, a marine aquarium, a vivarium with excellent appointments, a workshop, etc. On the first floor is the laboratory for beginners, a lecture room, a photographic room, and galvanometer room. In the second story is the large lecture hall, with a practical arrangement for lantern projections, the library, an optical room, two

dark rooms with heliostat, prisms, etc., for the purpose of studying the effects of monochromatic light upon living organisms, etc. In the third and fourth stories are laboratories for physiological chemistry, vivisection rooms, etc. In the institute special attention is given to the study of comparative physiology, and the completeness and excellence of its appointments for this purpose can not easily be surpassed.

The *Hull Anatomical Laboratory* has four stories, and is 131 feet long and 55 feet wide. The studies here embrace human anatomy, histology, histogenesis, microscopic anatomy, embryology, and especially neurology and experimental psychology. In the basement is a cold-storage room, a crematory, a bone room, etc. The first story is devoted to psychology, with a collection of instruments that cost

FIG. 75.—University of Chicago. Hull Physiological Laboratory.

over $2,000, among which are instruments of Helmholtz, Du Bois-Reymond, Ludwig, Hering, Kühne, Ewald, König (I cite only a few Germans), and many others, and to histology. There is also a photographic workroom, etc. In the second story are other rooms for histology and neurology, which is here especially cultivated. In the third story is a large lecture hall and dissecting rooms for human anatomy. In the fourth story is a vivarium and laboratories for special research.

YERKES ASTRONOMICAL OBSERVATORY.

The Yerkes Observatory is situated about 75 miles from Chicago on Geneva Lake, Wisconsin, and about 1¼ miles from Williams Bay, a little town on the lake. It was founded in 1894 by Charles T. Yerkes,

at a cost of $300,000 and was opened in 1897. In spite of its youth it has already obtained a world-wide reputation under the direction of Prof. G. E. Hale. As I have not visited it I can only give a notice compiled from various sources. As early as 1892 Charles T. Yerkes conferred with Messrs. Harper and Hale concerning its foundation, and the latter in 1893 had the plans drawn up. The site was selected with care so as to be as free as possible from disturbances. It is 220 feet above the lake and 1,300 feet above sea level. About 50 acres of woodland are included in the site. The building, likewise designed by Henry Ives Cobb, is T-shaped, its principal axis (361 feet) lying east

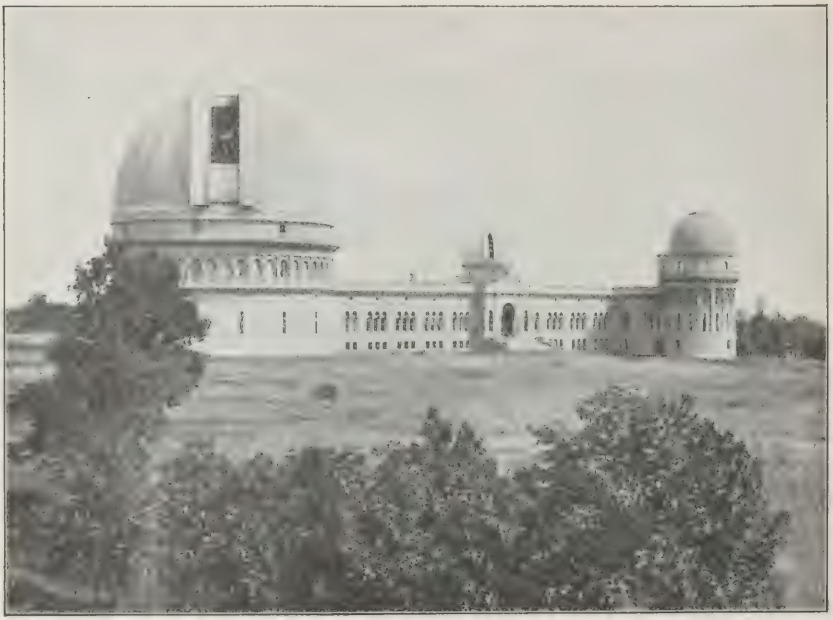


FIG. 76.—University of Chicago. Yerkes Astronomical Observatory.

and west. The dome for the telescope, which is 75 feet long with an objective of 33 inches, is at the western end and is 98 feet in diameter. This great telescope[a] is moved by an electrical apparatus, and the floor of the observing room, 82 feet in diameter, can be elevated and is movable through a range of 26 feet by means of electrical motors (fig. 77). A spectrograph, a photoheliograph, as well as a stellar and a solar spectrograph are attached to it. In the eastern wing, which runs north and south, is the heliostat room, 108 feet long and 13 feet

[a] It was exhibited in Chicago in 1893, and was until up to within a short time the largest in existence. One was made for the Paris exposition of 1900 having an objective 1.25 meters in diameter, and recently an American has offered one to the Pope that is still larger.

wide. The central body of the building contains a library, a lecture room, laboratories, photographic rooms, offices, etc. In the basement also are similar rooms, as well as an excellently equipped workshop. The power house is isolated from the observatory.

FIG. 77.—University of Chicago. The great telescope at the Yerkes Observatory.

Besides this the university has within its own grounds at Chicago a small astronomical observatory for the instruction of beginners, and about a mile and a half north of it in the city a second one, the Kenwood Observatory, for the instruction of advanced students in physical and practical astronomy and astrophysics, for which it is completely equipped.

LIBRARY.

Since 1893 the library has been temporarily installed in a nonfireproof building,[a] situated in the northeast corner of the university grounds. This is entirely insufficient and extraordinarily crowded, so that the building of a second temporary building was contemplated when J. D. Rockefeller, on Christmas eve, 1900, made a preliminary donation of $100,000 for a new structure. The university had already, in 1891, bought for about $17,000 the Calvary secondhand bookstore in Berlin, which was estimated to contain 280,000 volumes and 120,000 pamphlets, but was indeed much less and not as valuable as was expected; and it had also obtained in 1891 the entire library of the Baptist Union Theological Seminary, of Chicago, in 40,000 volumes. In 1899 the entire number of books possessed by the university amounted to 325,000 volumes[b] and 150,000 pamphlets (estimated), 71,235 volumes of which were in the 25 departmental libraries of the various institutes and seminaries, where, however, they are administered from the central library by a superintendent, an inspector, and four assistants. These reference libraries are completely catalogued according to authors and partially according to subjects. They contained in gross, in 1900, the following numbers of volumes: Theology, 9,350; biology, 7,685; political economy, 6,181; English, 5,432; history, 5,433; German, 4,920; Latin, 4,415; geology, 4,260; sociology, 3,703; philosophy, 2,914; romance languages, 2,905; political science, 2,651; and mathematics, 2,503.

COBB LECTURE HALL.

The Cobb Lecture Hall (fig. 78) was founded in 1892 by S. B. Cobb, at a cost of $225,000. A structure for a lecture hall was already in process of erection, so that on October 1 of that year the official opening of the university was celebrated in it, and it has remained its central point. It is 170 feet long, 82 feet wide, and 55 feet high, up to the roof. There are 23 lecture halls that hold a total of 800 persons—the largest, 78 by 45 feet, holding 400 persons; the second in size, 45 by 33 feet—besides the offices of the university. It is about to be united with the central heating plant.

GYMNASIUM.

The gymnasium is a temporary structure that in 1892 was built on the north, near the built-up portion of the university grounds, at an expense of about $18,000. The portion for men is 220 feet long and 55 feet wide, the hall 154 feet long by 55 feet wide; 420 lockers serve for depositing clothing. There is a running track 440 feet long, laid with linoleum. The portion for women is 100 feet long and 55 feet

[a] Only 20,000 of the most valuable volumes are stored in a fireproof room.

[b] In 1903, 367,442 volumes.

wide, of which 55 by 33 feet is devoted to bathrooms, dressing rooms, lockers, etc. The women's portion is to be torn down, as the site is assigned to a students' clubhouse and mess house. A special room serves for the physical examination of students, which is obligatory, and also for a library. The university physician not only continually supervises the hygienic appointments of all the buildings and the state of health of the students who consult him without charge, but he also informs himself especially as to their physical condition for intellectual work. Although the appointments of the gymnasium are good in themselves and compare well with those of Germany, yet they are by far unequal to those of Columbia and other American universities, and the new building for which A. C. Bartlett has recently given $200,000[a]

FIG. 78.—University of Chicago. Cobb Lecture Hall.

is anxiously awaited.[b] The gymnasium is open week days from 7 a. m. to 7 p. m.; on Sundays it is closed. Varied gymnasium exercise, one-half hour four times a week, is required of all undergraduate students, both male and female, independently of the athletic games. The athletic field adjoins the university grounds on the north and occupies an entire block. The organization of the university division of

[a] *Science*, August 2, 1901, p. 192.

[b] It will be ready for occupancy in October, 1903. The building and equipment will cost over $250,000. The building is 200 feet long by 80 feet wide. The swimming tank is 60 by 28 feet. A gallery with seats for 200 persons overlooks the water. A 12-foot running track, with 13 laps to the mile, extends around the walls, 12 feet above the floor.—1903.

physical culture and athletics is a widely embracing one, corresponding to the great part which athletic games play in American universities, too great, as appears to me,[a] in comparison with the too slight part given to it in Germany. In spite of the considerable receipts of the division, amounting to about $35,000, of which about $30,000 alone were derived from admission fees to the football games, paid by the public, there was in 1898–99 a deficit of $250.

POWER HOUSE.

A central power house for heating and for electrical supply was erected as long ago as 1892 alongside the university grounds, separated from them by a street. It is 131 by 138 feet in size. The engines are fed by coal oil provided by J. D. Rockefeller, the founder and chief supporter of the university. The present house is, however, no longer sufficient, and there has been begun the construction of a new larger central power house for electricity, heating, and water, from which subterranean conduits will be led to all the buildings of the university. It will be 300 feet long and 50 feet wide at the ground level, with a chimney stack 145 feet high, and will include a workshop for repairs. It will contain, among other things, an electric crane, for handling of coal and the like, that can be moved along the entire building.[b]

DORMITORIES.

The outer fronts of the four corners of the four southern blocks of the university grounds, taken as a whole, are devoted to dormitories. Here they stand, isolated, with great lawns that serve as playgrounds, the quadrangles in front planted with trees and decorated with beds of flowers. Only one portion is now built. There are four such quadrangles—one for women and one for graduate students, and two for the undergraduates. The row of houses in fig. 79 represents some of the dormitories for male students. On the right hand (near the Cobb Lecture Hall, fig. 78) is the north hall, especially for graduate students, and therefore formerly called the graduate dormitory. This row of houses corresponds to those seen at the left in Plate 32. Up to the present time there have been established four dormitories for men and four for women, the former being able to accommodate 236, the latter 220 students, a total of 456. The number of students in the university in the year 1899–1900 was 1,734 men and 1,449 women, a

[a] See also A. Bates: The Negative Side of Modern Athletics, *Forum*, May, 1901, pp. 287–297. In the summer of 1900 one of the track teams of Chicago University went to Europe in order to take part in the international contests which were held in London by the English and in Paris by the French.

[b] The new power house is now ready (1903).

total of 3,183, and in 1900–1901 there were 3,612, but it should be remembered that the maximum number of resident students at any one time during the latter year was only 2,000.

FIG. 79.—University of Chicago. Hitchcock Hall. Dormitory for male students.

The university builds and manages the dormitories and rents the rooms to the students. Within the dormitories there is, however, an official superintending organization called the university houses and bearing the name of the dormitory, as Snell house, Green house, South divinity house, North house, etc. The term "house" is generally

FIG. 80.—University of Chicago. Dormitories for female students.

used for dormitory instead of hall. All the inmates of a dormitory make up such a house, which has a head appointed by the president of the university, a woman in the case of the women's houses.[a]

[a] In his original report Doctor Meyer gives interesting details in regard to the social life of the students which are omitted from the present translation.

The yearly expenses of maintenance at the University of Chicago are officially stated at $287 for a minimum and $655 as a liberal allowance, $396 as an average for thirty-six weeks' work. The honorarium for tuition is always the same, $120, the price for rent and care of room varies from $42 to $225, the board from $100 to $225, laundry from $15 to $35, text-books and stationery from $10 to $50. Still one may live more cheaply, for a room near the university may be had for $1 a week, including heating and lighting, or with board for $4.50, and board alone in student clubs for $2.75 to $3.50 a week.

I may also mention that the house of the president of the university stands near the southwestern corner of the grounds, therefore near the dormitory for women (extreme right of Plate 33). The president holds regular receptions, whereby the social life of the university is kept up.

As appears from the plan of the buildings of the university grounds and their vicinity, which is attached to the annual register, it was the intention to line the four blocks originally assigned to the university somewhat symmetrically with buildings.

In the middle transverse zone is the university hall and library,[a] together with the chapel; at the four corners are the dormitories, with large rectangular lawns in front of them; in the middle longitudinal zone are variously shaped large, ornamental plots; and the remaining portions are more or less symmetrically filled with buildings of which there were 52 planned in all. Besides some provisional structures and the observatory at Lake Geneva, 17 of these have been completed, namely, 2 museums, 6 natural history institutes, 1 lecture hall, 8 dormitories; 21 are contemplated or in course of construction, 3 for modern, 2 for ancient languages, 1 for geology, 1 additional museum, 2 additional lecture halls, 7 more dormitories (one in course of construction), a hall with a library, a dining hall (building), the chapel, the gymnasium (building), the power house (building), and finally 14 whose special purposes have not yet been determined. In this original scheme of buildings, however, there are not included the two northern blocks, which, in 1899, Mr. Marshall Field, together with Mr. J. D. Rockefeller, presented to the university at a cost of $330,000. But after the Rush Medical College,[b] that is to say, the medical school, with nearly 1,000 students, which up to this time, situated in West Chicago, has been only externally associated, has begun to settle down with the university,[c] and, further, after the Pedagogical Institute of Chicago, funded with $2,000,000, has been transferred to the university,[d] a rapid advance will probably be made in the erection of addi-

[a] This plan has since been abandoned.

[b] According to *Science*, May 3, 1901, p. 720.

[c] Compare also the President's Report 1898–99, p. xix.

[d] *Science*, March 3 and 15, 1901, pp. 400 and 440.

tional buildings, if, indeed, this has not already occurred, for in Chicago matters develop so quickly and unexpectedly that descriptions frequently fall short of the reality.[a]

HISTORY OF THE UNIVERSITY.

If we take into account the buildings and installations established, created from nothing, since 1890, when the university was planned, up to 1899, we can only regard with astonishment the "phenomenally rapid growth" of Chicago University, as it is generally spoken of; yet those far-seeing men at its head have still greater aims in view which they will also attain.

The University of Chicago is all-embracing in the sense that it seeks to compass for both sexes the entire, broad domain of knowledge from the elementary school up to induction into independent research. But before I attempt to sketch its complicated organization, which differs in many points from that of other American universities, it may be proper to review its brief and eventful history, especially with regard to certain outside matters.[b]

A "University of Chicago" was founded as long ago as 1857, but it was obliged in 1886 to close its doors on account of financial difficulties. It sprang from the bosom of the Baptist Church, which also again took steps for the founding of a new university. In 1888 J. D. Rockefeller, of New York, conferred with Dr. W. R. Harper, professor of Semitic languages at Yale University, New Haven, Connecticut, in regard to the reestablishment of the university in Chicago, as this appeared to him the duty of the Baptist denomination of the country, and also entered into communication with the American Baptist Educa-

[a] How true this remark is may be illustrated by the fact that while I was revising my manuscript (in July, 1901), I received news from President Harper that corner stones for the following buildings had recently been laid: The press building, a dormitory for undergraduates (Hitchcock Hall); the university dining hall, with its kitchen; the University tower; the clubhouse for university students, an assembly hall (Mandel assembly hall) and the school of education. I also learn from newspaper notices, that L. Mandel, of Chicago, gave $100,000 for the assembly hall; J. J. Mitchell, of Chicago, $50,000 for the tower; the executors of J. Reynolds, in Chicago, $80,000 for the clubhouse, and a great business man, who wishes to remain anonymous, $100,000 for the dining hall. The school of education will cost $1,000,000.

[b] In 1897 H. Moissan wrote a brief sketch of the University of Chicago, which was translated and published in the Report of the Commissioner of Education for the year 1897–98 (Washington, 1899), II, pp. 1443–1447. He there relates, among other things, that a professor at a university, without any ceremony, presented him from the collection a piece of fossil wood that pleased him, and that was neither numbered nor catalogued. He instinctively looked around to see if they were observed. He adds: "It is only in America that one sees such things." With regard to this I might properly say that one will hardly find anywhere such careful cataloguing as in the American museums, and that if that professor gave him the specimen he was doubtless authorized to do so.

tion Society, which was founded in Washington in 1888. The result of the conferences which the society carried on was that in 1889 Rockefeller contributed $600,000 as an endowment fund, the income only of which could be used for current expenses, and under the condition that within a year $400,000 should be given by other parties for the purpose of purchasing land and erecting buildings thereon. This condition was fulfilled in 1890, and in addition Marshall Field, of Chicago, presented land for half of the site, the other half being bought for $132,500, altogether three blocks, to which, in 1891, a fourth block was added, costing $150,000, and in 1898 a fifth and sixth block, costing $340,000, toward which Mr. Field again contributed $135,000 and Mr. Rockefeller the remainder. The cost of the land aggregates, therefore, up to the present time, over $750,000.

On September 10, 1890, the University of Chicago was incorporated as such by the State of Illinois, its objects, as set forth, being to serve for the higher education of both sexes on equal terms, its management being confided to a board of 21 trustees, two-thirds of whom, as well as the president of the university, must be members of regular Baptist churches, the university to have, however, a purely literary and scientific character, and no professorship or place of any kind to be dependent upon a religious test. A few days thereafter Mr. Rockefeller again gave, to be invested, $1,000,000, four-fifths of the proceeds to be used for the general purposes of instruction and one-fifth for the theological faculty, and Prof. W. R. Harper was appointed president. The latter accepted the office on July 1, 1891, and has ever since been the active force of the whole enterprise, as in fact he had been since 1888, constantly maintaining the view that it ought to be a real university and not a nominal one, as are so many in the United States. It was further arranged that the Theological Seminary of the Baptist Union in Morgan Park, Chicago, established since 1860, be constituted the theological faculty of the university (divinity school) under this condition, among others, that a dormitory costing $100,000 should be erected for the accommodation, without charge, of the theological students, in consideration of which the academy of the university should be established in the buildings at Morgan Park. With the seminary the university also obtained a theological library of 40,000 volumes, as previously mentioned.

From January, 1891, to May, 1892, there were six bulletins published on the plan of organization of the university which had been previously submitted to the criticism of more than 50 American institutions for higher education. In 1891 the heirs of the first mayor of Chicago, W. B. Ogden, endowed a faculty of natural sciences (Ogden Scientific School) for physics, chemistry, biology, geology, and astronomy. This was under a provision of his will that prescribed that 70 per cent of his property should be devoted to charitable purposes.

Up to 1898 $300,000 of this had been liquidated and $200,000 more are expected. In the same year occurred the purchase of several hundred thousand books and pamphlets comprising the library of the Calvary Antiquariat at Berlin. In 1892 S. A. Kent, of Chicago, gave $235,000 for a chemical laboratory, Mr. Rockefeller another endowment of $1,000,000, and Mr. Field $100,000 for buildings, under the condition that within three months an additional sum that should raise the total to $1,000,000 should be secured for the same object from other parties. This was done in Chicago itself; the sum was even exceeded, and many complained that they had not been asked to contribute. S. B. Cobb had given $150,000 especially for a lecture hall; G. C. Walker $130,000 for a fireproof museum; M. A. Ryerson $150,000 for a physical laboratory (to which he added in 1894 $75,000 more) and $50,000 besides; Mrs. N. S. Foster gave $60,000; Mrs. E. Kelly and Mrs. J. Beecher each $50,000, and other ladies $18,000, all for dormitories for women; Mrs. A. J. Snell $50,000 for a dormitory for young men students, and in addition to this there were 20 leading business men of the city who together guaranteed $100,000 in case the required sum was not forthcoming.

In order to show the farsightedness that animated the men of the university, I will mention that in June, 1892, when there had already been a large staff of teachers appointed, though as yet there was not a single student, and when everyone had his hands full with organization and installations, $250 was granted for the American School of Classical Studies at Athens.

On October 1, 1892, the university was opened to students with a ceremony exclusively of a religious character. Only the lecture hall and three dormitories were ready; for everything else rooms had to be rented in the neighborhood. As a slight recognition of the indebtedness which was felt toward Mr. Rockefeller it was voted that the words "Founded by John D. Rockefeller" be added to all official reports, publications, and correspondence of the university. In the same year this founder gave still another sum of $1,000,000 as an endowment for the compensation of instructors. On January 1, 1893, the university had a teaching corps of 172 persons, of whom there were 73 professors (4 German) and 61 fellows for 594 students, nearly one-fourth of them being women. In 1893-94 a fund amounting to $1,000,000 was formed for the general equipment of the university, of which Mr. Rockefeller contributed half, M. A. Ryerson, of Chicago, $100,000, the remainder coming from various sources. In 1894 Mrs. C. E. Haskell, of Chicago, established an oriental museum at a cost of $100,000, adding $40,000 for lectures on comparative religion, and Charles A. Yerkes, of Chicago, founded an observatory with $300,000. In 1895 the total number of students was already more than 2,000. From 1893 to 1896 Mr. Rockefeller had given for various purposes,

besides the bequests already mentioned, $400,000, and in 1895, for the fourth time, he made an endowment of $1,000,000, and promised $2,000,000 additional in case a like sum was contributed from other sources by 1900, and this was also done.[a] Further, Miss H. Culver, of Chicago, in 1895 gave $1,000,000 for biological sciences (see above, p. 496), and Mrs. A. Hitchcock, of Chicago, gave in 1900 $200,000 for a dormitory for young students and the endowment of professorships. The gifts in the year 1898–99—the school year runs from July to July—reached a total of nearly $750,000, $500,000 of which were from Mr. Rockefeller. Besides his $2,000,000 gift which was due April 1, 1900, he gave in the same year another $1,000,000 for capital stock and $500,000 for immediate use, with the desire that $100,000 of it should be employed for a building for the library and press. In all, the university had obtained up to the end of 1900,[b] $13,000,000 from private subscriptions,[c] but not a penny from the city, State, or General Government; of this amount Mr. Rockefeller alone has given $9,000,000, and all but $1,000,000 of the remainder he has in a manner incited, in that a condition was attached to his gifts that such and such sums must be raised from other sources.[d] In 1899,

[a] Concerning this transaction the most fantastic statements were published in the German papers. Thus, a Berlin paper informed its readers that the university would have been bankrupt had not this sum been forthcoming; a Dresden one, on the contrary, said that President Harper raised it in twelve hours, while he had been four and one-half years doing so, even this being a most astonishing performance.

[b] See *New York Weekly Tribune*, December 20, 1900.

[c] At the decennial celebration held June 18, 1901, President Harper said, among other things, that while one could see now what it was possible to do with $10,000,000 to $12,000,000 for the establishment of an institution for higher education, yet before half of the new century had elapsed the world would know what $50,000,000 could do for that purpose. (Chicago *Record-Herald*, June 19, 1901, p. 2.)

[d] Besides, Mr. Rockefeller by no means confines his benefactions to the University of Chicago, and by his example has perhaps done more than by his gifts themselves. Quite recently Andrew Carnegie, of Pittsburg, has surpassed him in gifts for educational purposes (see p. 474), crowning these during this year (1901) by giving to the four universities of his native land, Scotland, $10,000,000 in order to elevate them and to assist the students. In 1902 Carnegie gave the same sum for an Institution for Scientific Research in the City of Washington, 1903. John D. Rockefeller was born in 1839; his father was already living in the United States. Disparaging statements are made here and there as to the way in which he acquired his wealth (for example by F. de Norvins: Les Milliardaires Américains, Paris, 1900, p. 100 et seq.), but more shrewd than the robber knights of the middle ages, to whom many of our first families owe their wealth, he has certainly not kept up his practices, and it can therefore likewise be said for him: non olet. In America to-day a rich man may not keep his money or leave it chiefly to his relatives. Public opinion compels him to other methods of disposal. In Boston it is epigrammatically said that no one would dare to die without leaving something to Harvard University, and a minister in Brooklyn humorously remarked that he would not preach the funeral sermon of any rich man until he knew what his will was. It is unjust to inveigh against great fortunes when their possessors support our hospitals, libraries, and universities (see The Justification of Wealth in *The Nation*, LXX, 1900, p. 66).

$5,500,000 of the total fund of $13,000,000 were invested, yielding a secure annual income of $210,000, or 29 per cent, toward the payment of the total expenditures of $730,000, the students contributing $270,000 (37 per cent), while Rockefeller gave $200,000 (28 per cent), and the small remainder was derived from various sources. The expenditure for salaries of the instructors was, in round sums, $390,000 (54.7 per cent), stipends[a] $60,000 (8.5 per cent), for printing and publishing $50,000 (6.8 per cent), for expenses of buildings and grounds $83,000 (11.5 per cent), for books $14,000 (1.9 per cent), the remaining 16.6 per cent for general expenses.

According to a statement which occupied almost an entire closely printed folio page of the *Chicago Tribune*, January 1, 1901, p. 17, there was given by private persons in the United States in 1899 $80,000,000 for educational purposes, libraries, museums, charitable objects, churches and religious enterprises, as well as to cities for the public benefit and entertainment, sums under $1,000 not included. In 1900 the total was $62,500,000, of which there was applied to educational institutions, museums, and libraries $40,000,000, Washington University, in St. Louis, obtaining $5,000,000, the Carnegie Museum, in Pittsburg, $3,500,000; the University of Chicago, $2,600,000; Clark University, in Worcester, Mass., $2,400,000; Yale University, in New Haven, $1,300,000; Brown University, in Providence, $1,000,000; the Cooper Union, in New York City (see p. 366), and the University of Syracuse each $830,000; Harvard University, in Cambridge, $730,000; Drake University, in Des Moines, $530,000; Columbia University, in New York, $500,000, and so on. During the year 1901, besides he donations amounting to $1,300,000 already mentioned, there were known to me the following great gifts from Chicago alone: Dr. D. K. Pearsons, who from 1890 to 1900 had already given $2,500,000, almost wholly for educational objects, in sums of from $15,000 to $300,000, disposed during his lifetime of the remainder of his property, amounting to $1,500,000, for the same objects, having especial regard to the small colleges of the West, retaining only for himself and his wife an annuity of $30,000; and J. O. Armour, together with his mother, gave to the Armour Institute (school of engineering) $1,250,000, after his father had founded the same with $4,000,000. According to the American *Monthly Review of Reviews*, August, 1901, p. 152, the endowments for American colleges and universities in June of this year were greater than ever before. Among others, Brown University, in Providence, obtained $2,000,000, and Harvard University, in Cambridge, $1,000,000 for its medical faculty. "The best of all uses of public benefactions is not for charity to the poor or even to the sick and defective, * * * not for lower education or religion, * * * but rather for affording the very best opportunities for the highest possible training of the very best minds in universities, because in training these the whole work of church, state, school, and charity * * * is raised to a higher level, and in his service all other causes are at the same time best advanced." (The *Nation*, LXX, 1900, p. 229.) This, too, has always been the German principle, and to that end the governments of single states and the representatives of the people have cherished the universities with the greatest care, so that in Germany the most and best universities are found. In America this is sought to be attained partly through state and partly through private universities, and there can be no doubt but that it will also be attained there.

[a] These are the so-called scholarships and fellowships, the first for junior students, the last for those who have attained the doctorate. They vary from $125 to $440. In consideration of this the recipients have to perform a service at the University of from one and one-half to two hours daily.

In 1899–1900 the university had 3,183 students, of which 1,449 were women, and in 1900–1901, 3,612 students with 240 teachers and 25 administrative employees (11 women, 4 with title of professor), who receive salaries varying from $400 to $7,000. Among the instructors were 12 Germans, and 53 had studied in Germany. In 1900–1901 there were 1,200 lectures, mostly arranged in courses of three months' duration, corresponding to what, as we shall see, is known in Chicago University as the quarter system.

FEMALE STUDENTS.

The number of female students in Chicago University has increased from year to year. In 1892–93 it was 24 per cent; 1893–94, 33 per cent; 1894–95, 35 per cent; 1895–96, 36 per cent; 1896–97, 37 per cent; 1897–98, 38 per cent; 1898–99, 43 per cent; 1899–1900, 45.5 per cent, in a total of 3,183 students, there being 1,449 females and 1,734 males.[a] The dean of the women says, in the introduction to a highly interesting annual report,[b] that in the University of Chicago these relations are much more simple than in most other institutions for common instruction. From the beginning each and every one of the women has stood on the same terms as the men; never in the world was the work of women as scholars less hampered, and nowhere is it easier for women to obtain a university training. The woman student on entering the university is subject to the same rules as the man student, proceeds in exactly the same manner in respect to choice of studies and business relations and shortly finds herself in class room, laboratory, and library, working side by side with men, and with no question as to her right or privilege.

QUARTER SYSTEM WITHOUT VACATIONS.

Another essential characteristic feature of the University of Chicago is its quarter system almost without vacations, which has introduced an entirely new principle into university instruction, which thus continues on unbroken. The quarter is the unit of reckoning, as is the semester in Germany. The academic year begins on July 1 and is divided into four quarters, which begin respectively on the 1st of July, October, January, and April, and last twelve weeks, there being

[a] In the winter semester of 1900–1901 there were at the 21 German universities among 34,363 students and some 2,000 auditors (summer semester, 1901, 35,552 matriculate students), 1,029 women, 12 of whom were matriculate and probably about one-third of whom were foreigners (it was only at Jena that no female students were allowed, but they are now admitted—1903). In the United States in 1898–99 there were 109,659 males and 37,505 females who enjoyed the higher education, of which 18,948 women were at universities and colleges for both sexes, 4,593 at higher women's colleges, and 10,866 at such of lower grade, 1,339 at technical schools, 1,759 at professional schools. (Report of Commissioner of Education, 1898–99, II, 1900, p. 1582.)

[b] President's report for 1897–98 (1900), pp. 110–135.

a recess of one week at the end. Each quarter has two equal terms of six weeks. The courses are classified as majors and minors. A minor calls for four to five hours of class-room work (or its equivalent) each week for six weeks; a major requires the same for twelve weeks. Eight to ten hours work a week is called a double minor or double major. The prescribed amount of work for each student is three minors, or one major and one minor in each half quarter. One major and two minors will also be allowed if it is evident that a student is properly using his time. Naturally the courses in a particular science usually last over several terms, six weeks is only the unit, but they must be so adjusted that anyone, without disadvantage to himself or the subject, can begin at the beginning of a quarter.

Each instructor teaches thirty-six weeks during the year, ten hours or its equivalent a week. He enjoys a quarter's vacation, and is free to choose it whenever it can be arranged, or he may take two vacations of six weeks each at different times of the year. If he voluntarily teaches according to agreement more than the normal amount he can obtain for it either a pro rata in salary (two-thirds the usual amount) or an extra vacation (full pro rata). Here, also, the custom prevails of allowing a so-called sabbatical year to the professors (see p. 367) but under more favorable conditions than are allowed in the other universities. Whoever lectures throughout three years of forty-eight weeks or six years of forty-two weeks receives a year's leave of absence with full pay.

RELIGIOUS FOUNDATION.

A third characteristic of the University of Chicago which deserves to be mentioned, at least in a comparison that most nearly concerns me—namely, that with the German universities—is the religious foundation which underlies the entire institution. As we have already seen, the university owes its origin to the religious feeling of J. D. Rockefeller, who regarded it as a duty owed to the Baptist Church, of which he was a member, that something should be done for the elevation and instruction of the people, and although he did not in the beginning have something grand in view, yet through the influence of prominent men he was soon brought to consider it.

Although the articles of incorporation require that the president of the university and 14 of the 21 trustees shall be Baptists, yet it was stipulated from the beginning that the university should bear a purely literary and scientific character, and that no position of any kind should be dependent upon a religious test. This has been strictly adhered to, and, besides, in 1899 the university congregation, which is a governing body composed of over 200 members, meeting quarterly or oftener, made the following public announcements:

1. That the principle of the complete freedom of teaching for all

and every one has prevailed in the Chicago University since its beginning as a fundamental proposition, as is shown by the conduct of the president and of the trustees and in the actual practice of the president and the professors.

2. That this principle shall never, neither now nor in the future, be put in question.

3. That it is desirable, in order to be always clear upon this subject, that the university, as such, should not take part in public affairs and that public expressions by the professors relative to public matters shall be regarded as personal.

ORGANIZATION OF THE UNIVERSITY.

It remains to sketch the organization of the university. This is not yet fully completed, for it has, as yet, only a theological faculty (divinity school), with an annex of an English theological seminary, a Scandinavian theological seminary, a philosophical faculty (graduate school of arts and literature), and a faculty of natural sciences (Ogden Graduate School of Science). There will later be organized, as soon as means allow, a law faculty, a medical faculty,[a] a faculty of engineering, a technological faculty, a pedagogical faculty[b]—one for the fine arts and one for music.

The university includes five divisions: (1) The schools, colleges, and academies; (2) the university extension; (3) the university libraries, laboratories, and museums; (4) the university press; (5) the university affiliations.

The first division includes the faculties which have just been mentioned (schools), the colleges for art, literature, natural science, commerce, and administration and university college. Each of these colleges is again divided, as is usual, into a junior and a senior college. Finally, there is the academy in Morgan Park, a secondary school.

The second division, the university extension, directs the work of students who can not attend the daily exercises of the university.[c] It conducts lectures at places more or less distant from the university (lecture study department), study by correspondence (even in foreign countries), examinations for outsiders, and the library; that is to say, the utilization of the library for students not at the university itself.

[a] Recently the whole of Rush Medical College of Chicago has been transferred to the university, and part of the medical lectures will be held there. This, then, now constitutes the medical faculty. 1903.

[b] This faculty is now constituted by the recent transfer to the university of the Chicago Pedagogical Institute. 1903.

[c] The English call this extension of university instruction the People's University, for its benefits are open to all. It rightly is regarded as absurd if anyone considers that he has ended his education at any definite time, for it can only be ended by death. Alexander von Humboldt was not ashamed to attend lectures even when an old man. I must refrain from giving here a special description of the Chicago University Extension.

The third division includes the general library and all the departmental libraries, the general and special museums, the laboratories, apparatus, and all other material used for instruction.

The fourth division includes the publications of the university, the printing office, the purchase and selling of books, apparatus, and other means of instruction, as well as the literary exchange.

The fifth section includes the relations with institutions which, without belonging organically to the university, have affiliated themselves more or less with it.

The officers are the president, the chaplain, the recorder, the registrar, the deans, the directors, the professors, and the teachers. They are arranged, for the administration of the university, into the university congregation, the senate, the council, seven faculties,[a] and six university boards,[b] each of these bodies with a prescribed function which I will not particularize here. Over all are the 21 trustees, who choose from among themselves a president, a vice-president, a treasurer, a comptroller, and a secretary.

The following sciences were, in 1899–1900, taught in the University of Chicago, each constituting a department: Philosophy, pedagogy, political economy, political science, history, archeology, sociology, anthropology, comparative religion, Semitic languages and literature, biblical and Patristic Greek, Sanskrit and Indo-European comparative philology, the Greek language and literature, the Latin language and literature, the Romance languages and literatures, the Germanic languages and literatures, the English language and literature, including rhetoric, literature, mathematics, astronomy, physics, chemistry, geology, zoology, anatomy, physiology, neurology, paleontology, botany, rhetoric, Old Testament literature and interpretation, New Testament literature and interpretation, biblical theology, systematic theology, church history, homiletics, church polity, and pastoral duties. At the same time there are 25 seminaries and scientific institutes.[c]

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[a] These are not taken in the sense of the faculties at the German universities. The seven faculties of the University of Chicago are: (1) the faculty of the Morgan Art Academy (elsewhere, instead, the faculty of the teachers' seminary is mentioned); (2) the faculty of university extension; (3) that of junior colleges; (4) that of senior colleges; (5) that of the graduate school of arts and literature; (6) that of the Ogden (graduate) School of Science; (7) that of the divinity school. Only the three last correspond to faculties in the German sense.

[b] Administrative board of the university press; administrative board of the university libraries, laboratories, and museums; administrative board of the university affiliation; administrative board of physical culture and athletics; administrative board of student organizations, publications, and exhibitions; administrative board or the recommendation of teachers.

[c] In Leipsic there are 54, of which, however, 16 are in the medical faculty which is just about to be established in Chicago.

ELEMENTARY AND SECONDARY SCHOOLS.

As characteristic of the University of Chicago, there deserves to be mentioned the secondary school connected therewith (university academy in Morgan Park.) It was opened in 1892 in the former theological seminary that was merged with the university, and, like all the secondary schools of the United States, was for both sexes. Recently, however, girls have been excluded because the pupils all live in the house itself and not, as in many other secondary schools, in their families.[a] The school is about 7½ miles distant from the university, and consists of a row of buildings, a library with 5,000 volumes, dormitories for 170 pupils, etc. The academy is attended for from four to five years, preparation for college being thus attained. The instruction includes Latin, Greek, French, German, mathematics, history, physics, chemistry, botany, and geography. This secondary school belongs to the pedagogical department, as does also an elementary school situated near the university, which accommodates 100 children of an age from 4 to 14 years, and costs $13,000 annually. These are considered as necessary for the pedagogical department, and are, so to speak, laboratories in which problems of elementary and secondary education are to be worked out. "No work can commend itself more heartily to the attention of the investigator than the study of the growth and development of the mind of the child, and the adaptation of educational theories to such growth." A similar establishment on a larger scale has recently been organized at the Columbia University in New York,[b] and at the Chicago University there has recently been laid the cornerstone of a school of education for which $1,000,000 are available, and which will contain an elementary school for kindergarten instruction and for instruction in beginnings, a secondary school (academy) provided with a manual training school, and a normal school.

UNIVERSITY EXTENSION.

The university extension concerns itself chiefly with lectures in Chicago and in neighborhoods more or less remote, on philosophy, pedagogics, political economy, history, sociology, anthropology, Semitic languages and literatures, Greek language and literature, Romance languages and literatures, English language and literature, astronomy, geology, zoology, neurology, botany, music, art, Old and New Testament literature and interpretation, and in this the director of the art institute and employees of the Field Columbian Museum take part; these also are docents in the university. In 1898–99 there were 125 such courses held. Besides this, the university extension gives

[a] There are many secondary schools in the United States in which pupils of both sexes live in the school itself. These are the so-called boarding schools.

[b] See *Columbia University Quarterly*, III, pp. 243–246, 1901, The New Horace Mann School, by S. T. Dutton.

instruction by means of correspondence in the above-named sciences, as well as in theological seminary work, for such as have not attended any college. In 1898–99 1,049 persons availed themselves of such correspondence courses. It has been shown that many of the best students of the university have been brought to the university by means of correspondence study, and that many of the best students have been carried along in this way while necessarily absent from the university.

UNIVERSITY AFFILIATIONS.

The university permits certain institutions to affiliate themselves with it in order, through their influence, to favorably affect primary and secondary schools, as well as colleges, with a view to raising them to a higher level. This affiliation occurs in four forms organic membership in the university, semiorganic union with the university, alliance between the university and completely independent institutions, and tentative affiliation.

UNIVERSITY PRESS.

The publishing division of the university deserves special mention, especially as it is destined to great development. Quite recently the corner stone of a new building for its use has been laid.[a] The University Press consists of four departments: Publications (offices now established in the botanical laboratory building); printing (now established in the gymnasium); purchase of books and apparatus for the entire university, entirely done through this office, and bookstore and stationery for students and teachers (now established in Cobb lecture hall). The following are regularly published: The Annual Register, a comprehensive annual publication in quarto, which gives much information concerning the university; The President's Report, an annual publication in quarto; The University Record, a weekly paper; Circular of Information of the Graduate Schools and Colleges in the Departments of Arts, Literature, and Science; Circular of Information of the Divinity School; University Handbook; Circulars of Information of the University Extension Division; Calendar of the Morgan Park Academy; Departmental Programmes. The following periodicals: Journal of Political Economy (quarterly); American Journal of Sociology (bimonthly); American Journal of Semitic Languages and Literatures (quarterly); Biblical World (monthly); Astrophysical Journal (10 numbers per year); Journal of Geology (bimonthly); School Review (10 numbers per year); Elementary School Record (monthly); Botanical Gazette (monthly); American Journal of Theology (quarterly). Besides there are the following, which appear from time to time: Contributions to Philosophy (I–IV); Economic Studies (I–IV); Studies in Political Science (I–III); Studies in Class-

[a] Now ready, 1903.

ical Philology (I–V); Germanic Studies (I–III); English Studies (I); Physiological Archives (I); Anthropological Bulletins (I–III).[a] In 1898–99 there were expended for these about $41,000, about $6,500 of which was for salaries. In the printing office there were 20 to 40 typesetters employed, but the forms were sometimes printed outside. Besides the above-named official publications, the printing office also issued in 1898–99: Proceedings of the National Educational Association; Fifth Herbart Year-Book; Smith: Chemistry Outlines; Report of the New England Association of Colleges and Preparatory Schools; Report of the North Central Association of Colleges and Secondary Schools; Proceedings of the Southern State Association; S. W. Burnham: Catalogue of Double Stars, I (publication of the Yerkes Observatory); J. Dewey: School and Society (already in its 3d edition); Manual Training Magazine. In the book and stationery store there were sold in 1898–99 articles to the value of about $39,000. It is an unusually convenient arrangement for the professors and students that they can enjoy, within the university itself, a well-assorted bookstore, where they also receive a considerable discount.

CONCLUSION.

As I stood one beautiful clear evening in Indian summer upon the tower of the lofty Masonic Temple of Chicago, fanned by soft breezes, my glance swept far to the eastward over the unlimited expanse of smiling Lake Michigan, overarched by the blue heavens; on the west, however, the dark red sun laboriously struggled through the unsightly vapor that poured from the smoking, steaming Babel, from the million-mouthed monster of a city, a hell—yet looking out upon a seductive paradise!

"Chicago is the young giant among the cities of the earth, and is only at the threshold of its destiny," says a recent English observer. "We hope that during the coming years there will be removed from the way many of the stumbling blocks that we all very well know still exist to-day in this new and unequally developed city; but Chicago sixty years ago was only a prairie, with a few thousand men on it," so wrote to me recently one of my friends from there.

In the description of the institutions which has filled the previous pages I could do justice to only a portion of the intellectual life of this city, perhaps the most interesting one of the whole earth, especially because of its great contrasts; for to me the view from the lofty building appeared symbolical, and most interesting for a further reason—because so much is still to be expected from its development more than from any other city—that it promises to become one of the future

[a] There are also published by the students: The *University Weekly* and the *Cap and Gown* (a yearly publication).

"wonders of the world." The germs for this can be seen shooting up everywhere.

Many things I have been unable to include within the scope of my studies. Among these are the technical schools (Armour Institute and Mechanics' Institute), the medical schools, the hospitals, the city hall and county court-house, and others. The last named, double building, cost $5,000,000, and certainly offers much that is instructive in many ways as regards museum interests, as do, for example, the corresponding buildings in Boston, which I hope to be able to describe. Recently Mr. J. E. DuBois, from Dubois, in Pennsylvania, gave $1,000,000 for a Chicago medical school of homœopathic practices, with a hospital, which led me to lament that this large sum was not applied to efforts more scientific in character than those of homœopathy. I mention this in order to show how all possible interests find there a ready advocate. Perhaps there had deserved to be included in my report a description of a building like the "Monadnock" (named for a mountain in New Hampshire about 3,200 feet high), which is only 400 feet long and 70 feet wide, but is seventeen stories high and contains 1,200 business offices, with 6,000 persons constantly employed therein.[a] It constitutes, by itself, a postal district with 14 employees, who daily handle 45,000 pieces of mail and sell stamps amounting to $2,000.

Although not in this connection, I might, however, in order to illustrate the specially developed talent of the Chicagoans for organization, as is shown in the incredibly rapid establishment of their museums, libraries, and universities, mention one interesting installation among many others, namely, that of the city railway.

Chicago, the city of so many technical surprises, possesses a very remarkable arrangement of its city railways. From a center where almost the entire business life is crowded together in 20-story houses within a space of a few square miles, there radiate toward the south, the north, the southwest and the west, four great electric lines, elevated on iron viaducts, each 10 to 15 miles long. On the eastern side the business portion of Chicago is limited, as is well known, by Lake Michigan. The uniting member and turning place for all the elevated lines, giving at the same time an opportunity of transfer from one line to another, and yet constituting a line by itself, is the so-called Union Loop in the center of Chicago, perhaps the most remarkable and most frequented piece of railway in the world. The loop is a double-track viaduct about 2 miles long, that surrounds a rectangular area of a portion of the chessboard-like blocks of the business center. The area is five blocks wide and seven blocks long, and its seven stations are so arranged that from any point in the business center it will take not more than three minutes to reach the nearest one. In this way it is possible to reach a railway going in any direction, for the trains of all four of the elevated roads, as soon as they get to the business part of the city, must pass over the loop and stop at its eleven stations before they can again come to their own line and pass out toward the suburbs. The travel on this loop is enor-

[a] Life in such a colossus is depicted by H. B. Fuller in his readable romance, The Cliff Dwellers, which at the time created so unpleasant a sensation in Chicago, because in it the author unsparingly exposed some of the dark sides of social life among the swarming millions of the city.

mous. On an average day there are 1,000 trains or 4,000 cars used, and during the busy hours of the day there are always 30 trains at a time upon this short line, indeed on special occasions, caused by excessive crowding, the tracks of the loop are literally covered with trains; they often run at intervals of less than one minute apart. Although the loop is provided with a double track yet all the trains go in the same direction; the lines that join the loop at three of its four corners are distributed upon the two tracks, according to their frequency. In the first 14 months after it was established this remarkable railway was used by 80,000,000 of passengers. The great business houses situated near the stations have already begun to build stairways from their second stories connecting directly with the gallery of the station in order to spare their visitors the trouble of descending into the street. At each station there is also a special stairway for the trains of each line and a reserved space is railed off along the track, so that the loop may really be said to have 44 stations. The whole loop might properly be considered as a single gigantic terminal station for all four elevated roads, and as the grandest effort hitherto made to unite several railway lines in a single center. (Newspaper notice).

In conclusion I will name a few of the scientific, literary, and art associations of Chicago, as far as I heard of them, as these characterize the intellectual life of the city: Chicago Astronomical Society, Humboldt Club, Illinois Audubon Society, Audubon Club, Entomological Society, Mycological Society, Polytechnical Society of Chicago, Western Society of Engineers, Literary Club, Ravenswood Historical Society, Chicago Society of Egyptian Research, Altura Library Association, Chicago Library Club, Bibliographical Society, Book Club, Central Art Association of America, Chicago Art Association, Art Students' League of Chicago, Society of Western Artists, Illinois Chapter of the American Institute of Architects, Chicago Architectural Club, Chicago Ceramic Association, Altura Ceramic Art Club. These, however, by no means exhaust the list of such societies.

B.—NOTES ON SOME EUROPEAN MUSEUMS AND KINDRED INSTITUTIONS.[a]

INTRODUCTION.

After visiting, during the autumn of 1899, some of the museums and libraries of the eastern section of the United States, concerning which I made a partial report, it seemed to me desirable to revisit some of the principal museums of Europe, and to examine others for the first time, in order to have a just measure for estimation of the American establishments, which profoundly impressed me. The general direction of the Royal Collections of Art and Science in Dresden also commissioned me to do this in view of the proposed, though

[a] Translation of Über einige Europäische Museen und verwandte Institute-Reiseerfahrungen von Dr. A. B. Meyer. Verlag von R. Friedlander & Sohn in Berlin, 1902. Abhandlungen und Berichte of the Royal Zoological and Anthropologico-Ethnographical Museum at Dresden, X, 1902–3, No. 1.

recently deferred, erection of a new museum building in Dresden, and I now report on the result of my observations.

I could not, in the case of cities like London and Paris, undertake to make as detailed a report as I attempted for New York and Chicago, and as I hope to do for Washington, Philadelphia, and Boston (including Cambridge), for that would require much more time than I had at my disposal. There is, indeed, no necessity for this, for the museums and allied institutions of London and Paris are known to every one who has to do with museum administration. I could only endeavor to discuss what is new and worthy of imitation there, and what would be valuable for solving our problem in Dresden.

Although probably no one will take exceptions to my noting the good features that I find, yet in case of blame some one is certain to say that "those who live in glass houses should not throw stones." Of course I am aware of the inadequacy of my own efforts, and I know that in many instances the deficiencies are to a greater extent the fault of the circumstances than of the persons, for one individual has little control of the many combinations on which the historical development of museums and similar institutions depend. It is rare, at least in Europe, though possible in America, that anyone has an opportunity to commence at the beginning and build up an establishment from the foundation. My censure, therefore, can not and will not be personal, but will deal rather with the conditions that are beyond the control of the individual. If I am blamed for recounting my experiences principally in the form of personal impressions, the reader may be assured that I do so only for the purpose of allowing others to share them, for which purpose I can not avoid the subjective method of statement.

The arrangement indicates the course of my travels during September and October, 1901.

Photographs were in most cases difficult to obtain, and my illustrations are consequently not uniformly distributed, and in some cases unsatisfactory. To the gentlemen who were so good as to place originals at my disposal, and who were in other ways of much assistance to me, I here make acknowledgment of my sincere obligations.

V.—LONDON.

17. MUSEUM OF NATURAL HISTORY.

DEPARTMENT OF BRITISH MUSEUM, CROMWELL ROAD, S. W.

In its contents the Natural History Museum in London unquestionably occupies the first place among all such museums of the world. The portion to which the public is admitted is unusually extensive and is open daily from morning until evening. The visitors are not counted by turnstiles and the numbers published annually are consequently not

exact. The total for 1900 was 485,288.[a] One is not compelled to check canes, etc., though this can be done without charge. There are

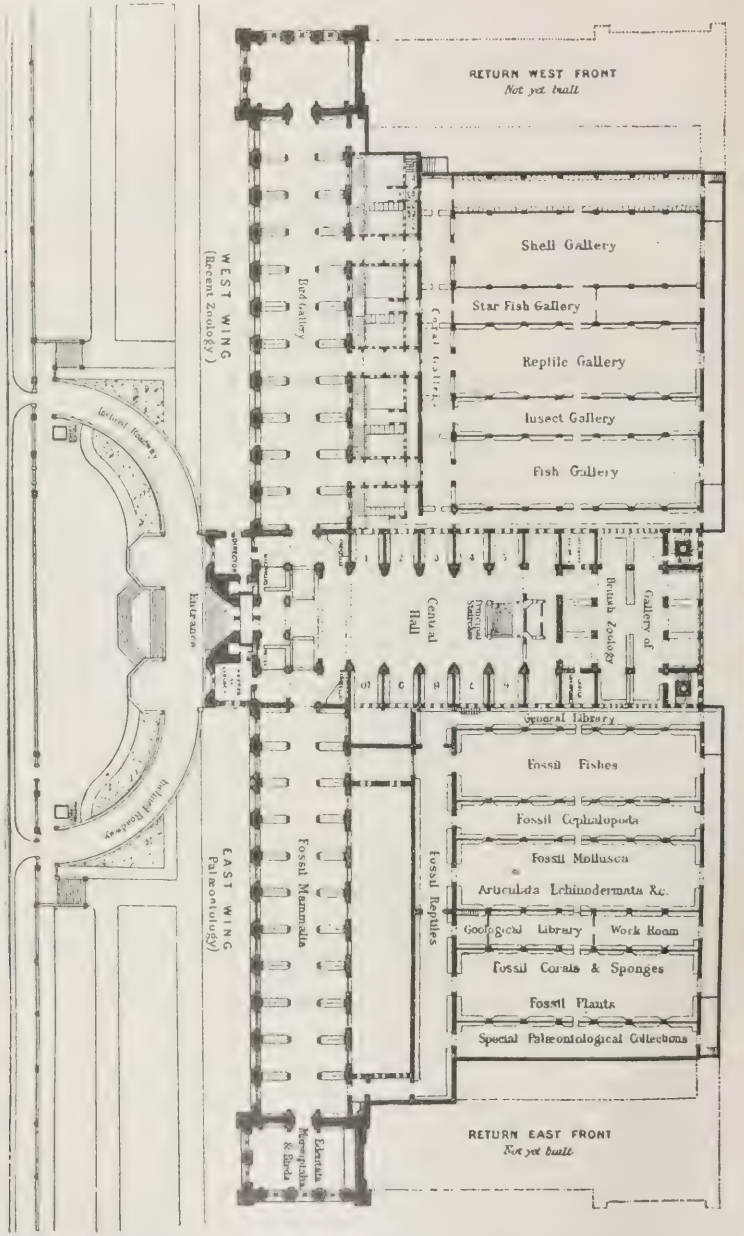

Fig. 81.—Museum of Natural History, London. Plan of ground floor.

very few seats for visitors. There is a restaurant in which one can dine at a reasonable price.

[a] In 1901, 417,691; in 1902, 433,619.

MUSEUM OF NATURAL HISTORY (PART OF BRITISH MUSEUM), KENSINGTON, LONDON.

The architect was A. Waterhouse.[a] Plate 33 shows the exterior of the building, figs. 81 and 82 the ground plans. The interior is impractical and disagreeable. Even the officials have positively expressed them-

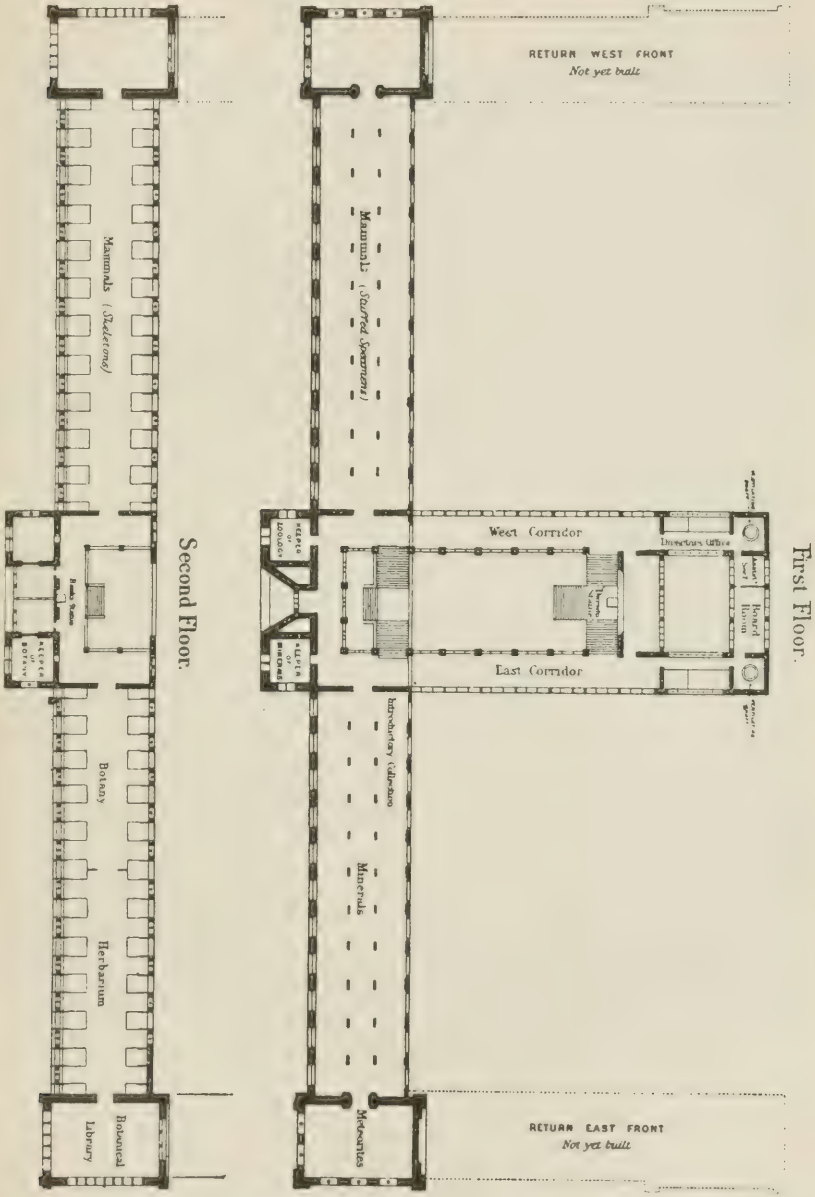

Fig. 82.—Museum of Natural History, London. Plans of upper floors.

selves concerning both of these defects, and are certainly the best judges

[a] The construction extended from 1873 to 1880. In 1886 the installation of the collections, which were formerly in the British Museum (Great Russell street), was completed. The building is 675 feet long and has two towers 190 feet high, while

of the first one. The very high entrance hall (Plate 34) appears to me to be too churchlike and empty. That it looks very dingy is, of course, due first of all to the London atmosphere, but perhaps also it is due to the character of the building materials and the yellow color, being of terra cotta, ornamented with animal representations in high relief.[a] The side galleries with skylights (fig. 83) give somewhat the impression of factory rooms. The installation is in some respects excellent, but in many cases is capable of improvement, notwithstanding the fact that enormous sums have been expended on it. Some groups of birds, for example, cost as much as $250 or more. Rather too much has been done in this respect to the greater neglect of other things. The cases are of mahogany, clumsy and unprepossessing; some of the backgrounds are green. The labels have been prepared with much care and taste. The arrangements for lighting are in part deficient. An anthropological gallery has recently been installed, which promises in time to be very attractive, but otherwise there has been but little general change in the twelve years since I last visited the museum. The number of visitors on the three occasions when I was at the museum was not great, and one can scarcely feel that there is justification for exposing these valuable collections to the light from morning till evening, when it is evident that they will be ruined thereby. If the shades are drawn, however, it becomes so dark that one can see but little. Everywhere in England the collections are exhibited during the entire day, and it is said that this custom must continue, for otherwise the money for expenses will not be forthcoming. I think, however, that this is an error. If the officials themselves were only convinced that the collections intrusted to their keeping are really being injured they would be able to impress this fact upon the trustees, but they fail to consider the subject, or at any rate have neglected it until very recently. The public would soon become accustomed to shorter hours of opening if there were some way of making them generally known. This is not the case now, everyone knowing that he can gain admittance from morning until evening.

There are no double windows, these always being omitted in English museums. There is no necessity for them, however, for no annoy-

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the large entrance hall is 170 feet long, 95 feet wide, and 72 feet high. Regarding the style the architect says (General Guide to the British Museum, Natural History, 1888, p. 12) that it is "earlier Romanesque, which prevailed largely in Lombardy and the Rhineland from the tenth century to the end of the twelfth century."

[a] The architect says (Guide to the Museum, p. 14): The Museum is the largest, if not indeed the only modern building in which terra cotta has been exclusively used for external facades and interior wall surfaces, including all the varied decoration which this involves. On the western side of the building, where it is intended that the zoological collection shall be placed, the ornamentation of the terra cotta (which will be found very varied both within and without the building) has been based exclusively on living organisms. On the east side, where geology and paleontology find a home, the terra-cotta ornamentation has been derived from extinct specimens.

MUSEUM OF NATURAL HISTORY, KENSINGTON, LONDON. ENTRANCE HALL.

ance is caused by frost and melting ice. In most respects the climate is milder than with us, though single windows are found also in many other European museums as well as in the large museums of the United States, where the winters are very cold. In the newly-constructed Natural History Museum in Brussels, however (see p. 597), I

FIG. 83.—Museum of Natural History, London. Side gallery containing fossil reptiles. Skeleton of an Iguanodon in the foreground.

found double windows with a very considerable space between the two lights. The Director was of the opinion that the great hall (84 by 30 meters) could not be heated without the double windows. I do not share this opinion, for in the present day any room can be well heated,

and moreover, double windows are just as likely to become frosted. These are not, therefore, necessary in a new building, unless we prefer them because the movement of air and consequently of dust can be diminished by their use, and because the dust from the street is less likely to enter, except when, as we shall see below, the windows are closely secured and dust-free air is brought in through other openings.

The museum can not be said to be entirely fireproof. Much superfluous wood is used, and the location of the heating apparatus is unfavorable.

The museum has four departments—zoology, geology, mineralogy, and botany. Its annual expenditure is about $250,000. Each department has a keeper who receives from $3,500 to $4,000, and there are assistant keepers with salaries of $2,600 to $3,200; assistants of the first class, with salaries ranging from $1,500 to $2,500, and of the second class, from $750 to $1,500.

Special mention should be made of the publication by the museum, at its own cost, of systematic descriptive catalogues aggregating considerably more than 200 volumes, with thousands of illustrations. In this undertaking the British Museum is preeminent and by it has put deeply in its debt every student of natural science. It excels all other museums of the earth so markedly in this respect that they sink into insignificance by comparison. It would be useless even to attempt to compete with England in this regard. These catalogues are not only catalogues of the collections of the museum, but monographs in which all known species are described, whether they are represented in the museum or not. There is, however, little that is lacking in the collections of the British Museum, for, as has already been said, no collections in the world can be compared with them in completeness. It is not my purpose here to describe in detail this famous collection. The most notable exhibits are, perhaps, those in the mineralogical and paleontological departments, and in the so-called "Index Museum" of the main hall, which serves as an introduction to zoology and is an original creation of the former director, Sir William Flower. Many museums have endeavored to imitate this feature to some extent. The catalogues mentioned are distributed liberally.

18. BRITISH MUSEUM.

[Great Russell street, Bloomsbury.]

In the British Museum on this occasion I confined my attention chiefly to the ethnographic collection. It contains many valuable old specimens, but has not kept pace with its sister collections. While Berlin has since the seventies built up an ethnographical collection which is scarcely to be surpassed, and good collections have been brought together in many cities of Europe and America, London has

made little progress in the latter half of the last century. The former director, Sir Augustus Franks, a man of European reputation, and during the time of his administration (1860 to 1880), the best authority on ethnographical matters—one might say the teacher of the older generation of ethnographers—gave in the latter part of his life less attention to the broader problems of ethnography. However, on account of the world-wide rule of the English Government, it is naturally and must continue to be the task of the British Museum to lead in ethnography, since that museum has greater opportunities than any other. This collection nevertheless has not made much progress, and the contents of the ethnographical department of the British Museum make no better showing than many of the continental museums, not to mention the Berlin collection. In this stepmotherly treatment of ethnography the British Museum does not set a good example to the other museums throughout that country, while the Berlin Museum, for example, has had and continues to have a fruitful influence throughout the whole of Germany. In London the antiquities resulting from the English explorations in the Pacific Ocean (the British Museum was established in 1753) are, however, still unexcelled. The arrangement, classification, and labeling leave something to be desired. The exhibits in halls lighted from above are crowded and not pleasing.

In this respect England has allowed herself to be surpassed, but this fault may be found with all of her ethnographic collections, excepting that at Oxford (see p. 533).

While much has been generally done in the British Museum in the way of explanatory labeling, this can not be said of the ceramic collection, which, however, still excels in that respect some of the continental collections.

The famous library of the British Museum, although it possesses such magnificent features, can not as a building or in many of its installations and contrivances compare with the new American libraries. It requires, for example, from a half to three-quarters of an hour to obtain a book, and, besides, the facilities for reading are not entirely convenient. Books are not allowed to be taken home. The printed catalogues, on the other hand, are unequaled, being—considering the riches of the collections, for the most part bibliographies, while they contain also a large number of cross references—admirable works. G. A. Crüwell[a] calls them "a milestone in the history of catalogue making." In 1875, the manuscript catalogue having increased to 2,000 volumes and being too unhandy and cumbrous for use, its printing was undertaken, and was completed in twenty years, from 1881 to 1900, about 400 quarto parts at a price of $450. The increase, however, is so extraordinary that the printing has been continued, and

[a] Mittheilungen des Oesterreichischen Vereins für Bibliothekwesen, V, 1901, p. 32.

there has been published, for example, a three-volume subject catalogue in octavo, embracing the additions from 1880 to 1895, comprising over 120,000 works. The library receives all volumes copyrighted in Great Britain and Ireland and in the British colonies, and expends about $50,000 yearly each for purchases and for binding. As to the number of volumes erroneous reports are generally circulated. It is claimed that the National Library in Paris is the largest, with 3,000,000 volumes; then follows the British Museum, with over 2,000,000; then the Berlin Royal Library, with 1,000,000. As a matter of fact the British Museum is the richest, with from four to five millions, of which perhaps half a million are periodicals that occupy 12 straight miles and embrace over 30,000 different journals (exclusive of newspapers), in which respect no other library in the world even approximately approaches it. In wealth of books, therefore, the library of the British Museum in London is unequaled, though the number of readers is comparatively small—in 1899, 188,554.[a]

The total number of visitors to the British Musenm in 1900 was 689,249 persons, of which 43,892 came on Sundays.[b]

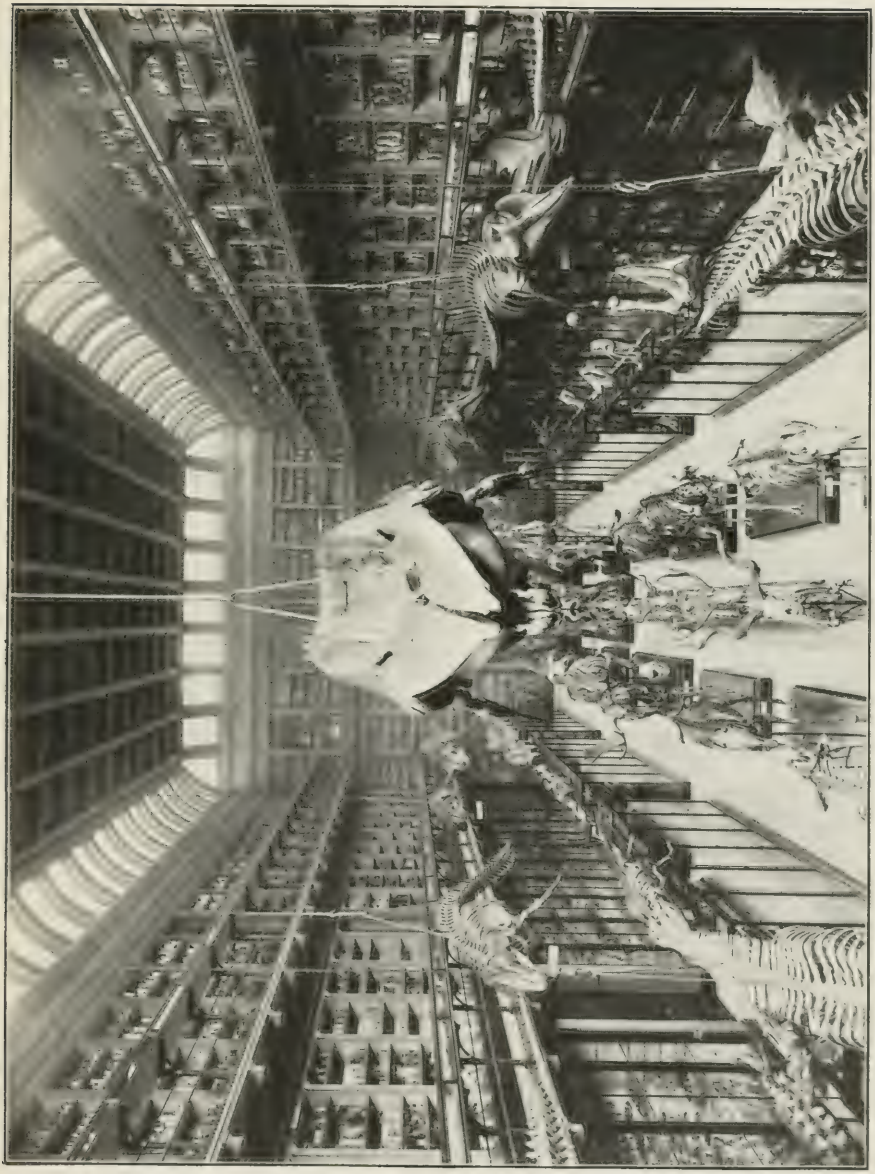
19. OTHER LONDON MUSEUMS.

MUSEUM OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

This famous museum of comparative anatomy, whose directors in recent times have been, in succession, Owen and Flower, can perhaps be regarded as the best natural-science museum in the world, even though it does not entirely correspond to the modern standard. It consists of a series of large halls with skylights and two or three galleries one above the other (Plate 35 represents one of these halls). On account of this arrangement the light is sometimes insufficient; there are corners and spaces underneath the galleries which are completely dark, and the reflection from the glass desk cases in the galleries is very annoying. The general effect, however, is noble and beautiful. Much stress is laid upon the admirable method of installation, though it does not always in every respect represent the highest advances. The anthropological collection is, in particular, not so carefully and scientifically installed as far-reaching demands would necessitate, and the whole museum could be kept much cleaner. There is, however, not a sufficient labor force for this purpose.

Although the disadvantage of high halls and galleries lighted from above was known, in order not to depart from the uniform plan of the interior of the museum a similar large hall has lately been added. The cabinets and cases are, as is almost uniformly the case in England, constructed of mahogany—antiquated and clumsy, and not dust proof.

[a] In 1900, 198,566; in 1901, 200,035. [b] In 1901, 718,614, of which on Sundays 48,895.



ROYAL COLLEGE OF SURGEONS, LONDON.
Hall of Comparative Anatomy.

The soot from the air of the city does not penetrate too much into the building, since, with the exception of the skylights, there are no windows in the halls; a double glass roof, moreover, offers considerable protection. The ventilation arrangements are primitive.

The library comprises 50,000 volumes and does not incorporate any books relating to systematic zoology. There is a card catalogue arranged by authors and subjects.

The collections contain upward of 11,000 comparative-anatomy preparations, among them upward of 3,700 fossil and nearly 2,700 pathologico-anatomical. Excellent printed catalogues concerning them are published, among others a Descriptive Catalogue of the Osteological Series contained in the Museum of the Royal College of Surgeons of England (2 vols., London, 1853, quarto, xlv, 914 pp.); a Catalogue of the Specimens illustrating the Osteology and Dentition of Vertebrated Animals, recent and extinct, contained in the Museum of the Royal College of Surgeons of England, I–III (London, 1879–1891, octavo, lxvii, 1036 pp.); a Descriptive Catalogue of the Teratological Series in the Museum of the Royal College of Surgeons of England (London, 1893, octavo, xxiii, 192 pp). The collection is, first of all, scientific, and as such is a true ornament to the nation.

The illustration given is reproduced from the Souvenir of the Centenary of the Royal College of Surgeons of England, 1800–1900 (London, 1900, quarto, 33 pp.).

SOUTH KENSINGTON OR VICTORIA AND ALBERT MUSEUM.

This famous museum of art and industry is unsuitable as a building, the lighting being in some parts very bad and the installation much too crowded and not well adapted for inspection.[a] The labeling is very good throughout, though the cards are printed in such small type that in the insufficient light they are often quite illegible. On the other hand, the former India Museum (Indian section), that now belongs to it, is installed in a primitive, unsystematic manner, and insufficiently labeled. Furthermore, the ethnographic section, part of which is very valuable, is not well arranged. The management of the oriental art collections, which, with the Indian one just mentioned, are now located in the adjacent Imperial Institute (which, intended in the first place for collections, is now occupied by the university), is not entirely satisfactory. New halls, however, are now being erected for both these large collections. It is impossible for me to do justice to the tremendous whole of the South Kensington Museum in the space of this report. Besides, it is generally known. Its excessive abundance of objects quite oppresses the receptive faculty of the most alert sight-

[a] "The worst possible conception of the mode of arranging museums is exemplified at South Kensington." W. S. Jevons, *Social Reform*, 1883, p. 59.

seer.[a] This overabundance constitutes an especial vice of museum science. Only the best should be readily accessible. Here also the collections are damaged by being exposed to daylight (also to electric light) from morning until evening, which is the more regrettable since a large portion of the exhibits are of such a nature as not to endure the light at all. The exposure is, therefore, scarcely justifiable.

The number of visitors to the museum in 1900 was 846,489, of which 87,854 came on Sundays. Umbrellas and the like are not deposited at the door. Visitors are at a disadvantage on account of the small number of trained attendants. The majority of attendants in nearly all English museums are policemen, who are engaged only temporarily. One is therefore unable to obtain information of any value concerning the collections, and on account of the size of the whole exhibition a study of the "guides" and "handbooks" is not to be thought of unless one is pursuing a single question. Even if a person wishes, for example, to obtain information about some certain object, it requires at least an hour or more, on account of the extent of the collection.

The annual expenditure for 1897–98 amounted to $420,000, of which $70,000 was devoted to the purchase of specimens, $190,000 to salaries ($60,000 to the policemen), $60,000 for cleaning, and $26,000 for heating and lighting.[b] Some very instructive data relating to the internal affairs of this museum may be found in the second report from the select committee on museums of the science and art department, with the proceedings of the committee, ordered by the House of Commons to be printed July 29, 1898 (folio, 105 pp.).

NATIONAL GALLERY.

The National Gallery, with its famous collection of paintings, lacks intimate charm in the style of its building and in the installation of the pictures. This is emphasized by the great influx of the general public. Umbrellas, etc., are required to be deposited. In 1901 it was visited by 478,346 persons on 204 free days, besides 35,704 on 30 Sunday afternoons, and 42,177 on Tuesdays and Fridays for an admission fee of six pence, making a total of 556,227. (The Dresden Gallery had, in 1901, 266,263 visitors.)

NATIONAL GALLERY OF BRITISH ARTS, OR TATE GALLERY.

The Tate Gallery is a new building, in classic style, designed by S. R. J. Smith and constructed in 1897–1899. I do not regard the building, as such, especially noteworthy or well adapted to its pur-

[a] "That the South Kensington Museum should have degenerated into a vast, chaotic *omnium-gatherum*, without intelligible plan, methodic province, or definite order, was only to be expected as the ultimate result of this system alone." T. C. Robinson, *Nineteenth Century*, 1892, p. 1029.

[b] For the year 1903, £66,994 has been granted, inclusive of the Bethnal Green Museum, a branch institution.

pose. In 1891 there were 185,344 visitors on 206 free days, besides 42,015 on 30 Sunday afternoons, and 25,821 on Tuesdays and Fridays for an admission fee of six pence; total, 253,270.

WALLACE COLLECTION.

This famous collection of paintings and works of art is installed in a palace (Hertford House), which, though it has been to some extent adapted to its present purpose, yet possesses many disadvantages as a museum. It is one of the greatest attractions of its kind in London. It formerly belonged to the Wallace estate, but was later presented to the nation. Its value is estimated at $20,000,000.[a]

ROYAL BOTANICAL GARDENS.

The Kew Gardens, the foremost scientific establishment of the world in systematic botany, is admirably administered, with an excellent museum of practical botany.

HORNIMAN FREE MUSEUM.[b]

"The arrangement of the building is as follows: Connected with some smaller halls, which are first entered, is a larger one about 108 by 60 feet and 42 feet high, with skylight, and encircled above with a gallery 6 feet 6 inches broad. These spaces constitute the front half of the building, and contain a systematically arranged ethnographical collection, chiefly of personal ornaments, which are installed in the gallery in cabinets. In the rear half of the building, on the ground floor, the ethnographical collection is continued. The hall is not provided with any light, and when anyone is admitted it is illuminated by electric lights. Here the objects are arranged more in a geographical order. The second story of the rear building is on a

[a] For the year 1903, £9,066 has been granted for the administration of this museum.

[b] Extracts from a report which was placed at my disposal by Dr. O. Richter, assistant in the Dresden Ethnographical Museum, who visited the Horniman Museum in February, 1902. I did not find time to visit this museum, on account of its distance in Forest Hill. From a description by the director, R. Quick, in the *Report of the Museums Association*, 1900, pages 58–63 (compare, also, the Horniman Free Museum, in *The Studio*, XXIV, pp. 196–202, with 5 illustrations, 1901), I note that this museum of art and science was built in 1899 by C. H. Townsend, in free Renaissance style, fireproof, of red bricks, with limestone front, in which is introduced a crystal mosaic picture 36 feet long and 11 feet high, after the design of A. Bell. The building has a bell tower 33 meters high, which contains a water reservoir for supplying the heating apparatus. The museum is, in its entirety, about 280 feet long and 65 feet wide. The collections were formerly installed in the residence of Mr. F. J. Horniman, who had zealously collected them in his travels around the world during forty years, and who allowed his residence to be torn down to make room for the museum. Since 1891 it has been open to visitors on three days in each week. Between 1891 and 1898, when it was demolished to make room for the new building, it was visited by 455,591 persons. Since 1891 the director has issued, annually, a brief report, with illustrations. The library contains 6,000 volumes. There are 7 officials. The entire cost of maintenance is defrayed by Mr. Horniman.

level with the gallery of the front half, and consists of a hall (natural-history collections) with a skylight, about 108 by 60 feet and 42 feet high, with galleries about it (insects, minerals).

"The main portion of the ethnographical collection is arranged by classes, as in the museum at Oxford (see p. 533). The cases are of mahogany, and also black, with panes of plate glass, 8 feet high, 40 inches broad, and 1 foot 7 inches deep, with sea-green background, and similar shelves, which show up the contents very distinctly. The labels are printed in black letters on a white ground pasted on a red-bordered card. Nearly every specimen has a label. The exhibit is very clean, intelligible, and elegant. The entire museum can be lighted by electricity, a portion of the lights being supported by brass mountings in the modern pendant style. In the dark adjoining room are placed apparently such parts of the ethnographical section as could not find place in the main hall without injuring its fine general effect, or whatever was unsuitable for exhibiting. This room represents the storehouse of the exhibition series. Eastern Asia and India are especially well represented, but there is also a fine Benin collection (see Seventh Annual Report, 1897, pp. 18, 19, Plates II–V), as also some things from New Zealand.

"In the zoological collection there are three fine animal groups, the elk, the walrus, and the polar bear."

BRITISH FIRE-PREVENTION COMMITTEE.

I should not omit mentioning an institution, praiseworthy and of unusual importance to museums, namely, the British fire-prevention committee, which has issued publications since 1898. These may be obtained at the offices of the committee (No. 1 Waterloo place, Pall Mall, London). The contents of the volumes bear upon the comprehensive functions and purposes of the society, as may be witnessed by a few of the titles here given: I (ten articles with many illustrations, 1898, $2). Fire-resisting floors used in London; Lessons from fire and panic; How to build fireproof structures. II (ten articles with many illustrations, 1900, $5). Fire tests with unprotected columns; Fire tests with floors; Fire tests with ceilings. III (ten articles with many illustrations, 1900, $5). Fire tests with doors; Fire tests with partitions; Fire tests with glass.[a] The chairman of the committee and the publisher of its reports is Architect E. O. Sachs, London.

It will be seen that I have treated in the above pages only a small portion of the London collections, and that portion only in the most cursory manner.

[a] There appeared also in 1902 two volumes, with 219 and 226 pages and very many plates, under the title Facts on Fire Prevention: The results of fire tests conducted by the British fire-prevention committee. Edited by Edwin O. Sachs, architect, London. B. T. Batsford, 94 High Holborn.

VI.—OXFORD.

20. UNIVERSITY MUSEUM, ETHNOGRAPHICAL DEPARTMENT (PITT RIVERS COLLECTION).

In Oxford, that famous old university town, which I visited first in 1878, the chief attraction for me this time was the famous ethnographical collection presented to the Oxford Museum in 1884 by Col. Lane Fox (later General Pitt Rivers), who died in 1900. Subsequently Colonel Fox founded a new collection in Farnham (Wiltshire), not far from Stonehenge, which has become quite as noted, but which, as it was too far away for me, I did not visit. The ethnographical collection is in an annex added in 1887 to the university museum, a modern

FIG. 84—University Museum, Oxford. Ethnographical section. (Pitt Rivers Collection.)

gothic structure (1857–1860). I pass over the natural-science collections, as I have no special remarks to make regarding them.[a] The ethnographical collection, however, is distinguished from all other similar ethnographical collections in the world by the manner of its installation.

"In all ethnographical museums a geographical classification is adopted as the principal basis of arrangement, whereby all objects from the same region are grouped together—a system obviously

[a] Prof. E. Ray Lankester, of the British Museum, said in 1897 concerning the building of the Oxford University Museum: "Our great university museum building is simply an absurdity." *Report Proceedings Museums Association*, 1897, pp, 21–22 (1903).

advantageous from many points of view, and especially to students of comparative ethnology, as showing at a glance the condition of culture to be found in any tribe, race, or district. In the Pitt Rivers Museum, on the other hand, the primary basis of classification which is adopted and which distinguishes it from other kindred museums, is one like that employed in the arrangement of most natural-history museums, the objects being grouped according to their morphological affinities and resemblances (as it were), all objects of like form and function being brought together into groups, which again are subdivided into smaller groups into genera and species, as one might almost say." (See Balfour's remarks in Report Museums Association, 1897, p. 51.) There is only one larger natural-history museum that is arranged geographically, and that is the Agassiz Museum of Comparative Zoology in Cambridge, in the United States, which on that account became famous during the life of its originator. Its reputation can not now be claimed to so great an extent, since, although it is otherwise so important in the scientific world, it has not in this one respect kept abreast with the times. There is, however, an example on a small scale of geographic classification of a zoological collection, which I shall mention beyond under Dublin. It is therefore possible to study in the Oxford collection, so to speak, the natural history and the phylogeny of the various arts and industries of mankind. To this end Pitt Rivers, so far as possible, associated in groups all like objects from the various parts of the world in which they occur. By means of such synoptic series, when fairly representative, geographical distribution of any class of implements, weapons, etc., may be seen and the relative condition and local variations of kindred or similar objects may be studied and views formed as to the important question of the monogenesis or polygenesis of certain widely distributed arts. The probable lines of dispersal where they have apparently emanated from one center, may be determined upon incidentally, of course, helping to throw light upon the migrations of races themselves. Moreover, by arranging the specimens in each group in progressive series—that is, by commencing with those objects which appear to be the most primitive and general in their class, and by leading gradually up to the higher and more specialized forms, the developmental history of the higher forms may be at any rate suggestively illustrated and material be supplied for the study of the growth of culture. We are enabled to form some conclusions as to the variations by which progress in any given art or industry has step by step been affected.[a] Inasmuch as the prehistoric status of civilized peoples, corresponding to that of our present lowly-cultured races is included, one learns to understand better the relics of former times that have remained to cultivated

[a] Report Museums Association, 1897, p. 52.

man. Ethnography thus develops into an eminently historical science. Maps, such as show the geographical distribution of the bow, etc., explanatory sketches and photographs, contribute to a better understanding of the specimens. Such an arrangement is unusually fascinating and suggestive, but it should not be without an adjoining collection geographically installed. Only a great ethnographic museum like the Berlin Museum could carry out both classifications. A very limited representation of this could formerly be seen in the Dresden nephrite collection, and additional attempts have been made in the collection of the East Asiatic Ceramics from the shores of the Indian Ocean, as well as in the collection of ear and arm ornaments.

FIG. 85.—University Museum, Oxford. (Pitt Rivers collection.) A corner of upper gallery.

But imagine the great mass of ethnographic objects from all the peoples of the earth arranged in this manner. To present an idea of what this is I give below the principal groups of the system, the fundamental principles of which were laid down by Pitt Rivers, but which have since been developed by the present director, H. Balfour. The small subdivisions number many hundreds. Pitt Rivers originally had his collection in his own private house (he was then called Lane Fox, only changing his name upon coming into his father's estate), but as it increased he lent it to the Bethnal Green Museum in London, a branch of the South Kensington Museum, where I saw it in 1878. From there it was later transferred into the last-named

museum, until it was deposited in Oxford. In 1877 there was published a very valuable printed catalogue by Lane Fox.[a]

Since then, however, the collection has increased, mostly through donations, and only slightly by purchase and exchange. The annual expenditure of the ethnographic section of the university museum is only $1,000, from which also an assistant must be paid, and occasional smaller sums allotted for additional purchases. Under these circumstances its progress is all the more remarkable.

Figs. 84 and 85 give representations of the interior. The Gothic building with skylights is not very suitable and is in some respects unattractive and unadapted to museum purposes (see, for example, fig. 85, part of a gallery). That the Gothic style is suitable for museum buildings is demonstrated by several American examples (University of Chicago, see p. 491), but it must be applied in a very different manner than in Oxford, where the typical Gothic halls are found without modification.

The system is as follows:

PRINCIPAL GROUPS OF SPECIMENS.

I. Prehistoric:

Grouped by period...
- *Paleolithic period:* British Islands, France, Egypt, India, Africa, Tasmania (recent).
- *Cave period.*
- *Kitchen middens,* ancient and modern
- *Neolithic period:* British Islands, France, Swiss and Italian lakes, Italy, Greece, Scandinavia.

Grouped by form and locality.
- *Stone celts* (axes and adzes) in geographical and morphological groups.
- *Hammer-stones, pounders, rubbing-stones, etc.*
- *Cores and flakes, worked-flakes.*
- *Scrapers.*
- *Knives, lance-heads, etc.*
- *Arrow-heads.*
- *Manufacture of stone implements, methods used.*
- *Natural-forms.*
- *Modern gun-flint making.*
- *Forgeries.*
- *Hafting of stone and shell implements.*

Use of bone, ivory, and horn in manufacture of implements—

Bronze age—

Age of copper.

Age of bronze, *celts (development of forms), knives, razors, chisels, daggers and swords, spear-heads, arrow-heads, mace-heads, rings, miscellaneous.*

Iron age: *Early axes and adzes, spear-heads and arrow-heads, swords and daggers.*

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[a] Catalogue of the anthropological collection lent by Col. Lane Fox for exhibition in the Bethnal Green Branch of the South Kensington Museum, 1874, xvi, 184 pp., 14 plates.

II. Arts of life:

War and the chase: *Clubs; boomerangs; spears and lances; instruments for throwing spears; arrows, quivers; bows (plain and composite), cross-bows, bullet-bows, blow-guns; archers' arm-guards, bowstring pullers; many-pointed spears; harpoons; slings, bolas; axes, and adzes; halbards; glaives*, etc.; *swords; daggers* and *knives; fighting-rings (cestus, etc.); fire-arms.*

Defensive arms: Parrying-sticks and *shields, body-armour, helmets.*

Food: *Fishing appliances, traps, agricultural implements, grinding-mills, cooking utensils, strainers*, etc.

Fire making (domestic and ceremonial); *Illumination (lamps, candles, torches).*

Pottery: *Handmade pottery, wheel-made pottery*, varieties, *substitutes for pottery.*

Clothing: *Covers and garments, head-gear, foot-gear, umbrellas and sun-shades, fans and fly-whisks, spinning, string-making, string and net-work.*

Locomotion: *Weaving; basketry; bark cloth; wheel* and other *transport; skates and snowshoes; navigation (boats, ships, paddles, etc.); horse gear (harness, bits, shoes, spurs, stirrups); whips and flagella; staves; cradles and baby carriers.*

Domestic appliances, etc.: *Tools (cutting, sawing, drilling, rasping, etc.); spoons, forks, knives; locks and keys; measures of weight, time, etc.; currency; writing and primitive records; dwellings; head rests; surgical appliances, medicine; metallurgy (bronze, iron).*

III. Arts of pleasure:

Personal adornment: *Toilet gear, mirrors, combs, cosmetics; tattooing; artificial deformation (head, feet, lips, ears, nose); hair and hair dressing.*

Personal ornaments: Ornaments of *shell, bones and teeth of animals, vegetable substance; armlets and leglets; belts and sashes; pouches, beads and bead-work; feather work; torques; rings; penannular rings; fibulæ; ring brooches; pins; cloak fasteners.*

Tobacco and hemp smoking, etc.: *Narcotics and stimulants.*

Musical instruments: *Percussion (rattles, gongs, bells, drums, etc.); wind (syrinx, whistles, reed instruments, trumpets)*; *stringed (musical bow, harps, zithers, dulcimers, guitars, fiddles*, etc.); *masks (dancing, ceremonial, dramatic).*

Art: *Graphic and plastic art; development of ornament and patterns; animal form in art; human form in art; zoomorphic, phyllomorphic designs; geometric patterns; loop, coil, and fret patterns; influence of textiles on designs, etc.*

IV. Magic and Religion:

Magic, sorcery, etc., *divination; primitive religion; oriental religions; ex votos; treatment of the dead; war trophies.*

V. Ceremonial implements.

OBJECTS COLLECTED DURING CAPTAIN COOK'S VOYAGES.

The valuable Cook collections are still kept together in a special series, for which we should be the more thankful since there are but few traces found in museums of this early stage of ethnographic science relating to the time of the first contact of Europeans with the South Sea Islanders.

The arrangement of the collection is of such a unique character that a thorough study, to be satisfactory, should be pursued for at least

several weeks. On account of the wealth of its contents, and the thoughtful manner in which everything has been brought together and arranged, it is hard to portray it graphically. The collection is extraordinarily complete in typical specimens, as a continuous effort is made to fill every gap. Very little has been published concerning these systematic series. The museum issues annual reports. The installation, arrangement in detail, and labeling still leave something to be desired, as is also true of the cases, which, being of the South Kensington pattern, are somewhat primitive.

The Oxford Ethnographic Museum seems to me to be in the first rank of establishments of its kind. I confined my attention in Oxford to the examination of this museum.

VII.—BIRMINGHAM.

21. CORPORATION ART GALLERY AND MUSEUM.

Birmingham has a population of more than half a million people. In the rear wing of the council house, built in 1878, in the Greek style, at a cost of $1,250,000, is located the Corporation Art Gallery and Museum. The rooms are large, insufficiently lighted with skylights, and in the largest hall is found a gallery. It resembles in its contents, arrangement, and general mode of administration, the South Kensington Museum in London, which has served as the pattern for many English museums, and which also often lends its collections to these similar institutions. On account of the very great smokiness of this large manufacturing city the interior of the Birmingham museum is blackened and not very attractive. On four days of the week it is open from 10 a. m. to 9 p. m.; on two, from 10 a. m. to 6 p. m. or 4 p. m., and on Sundays from 2 to 5 p. m. For several years, practically all over England, the museums have been opened on Sundays. That the exhibits are damaged by such a continuous lighting is certain, though in this respect it only shares the fate of all English and American collections.

In 1900 a university was founded in Birmingham, for both sexes, having an endowment of $3,000,000 and an appropriation by the city and state of $55,000 annually. There is also a library, founded in 1861, containing 260,000 volumes, with a yearly expenditure of $87,000, which daily circulates upward of 4,000 volumes. I devoted no time to these two institutions,[a] since the university is hardly organized and the library is not modern.

[a] For information see *Minerva*, XI, pp. 100–102, and J. J. Ogle, the Free Library, 1897, pp. 173–182; also F. J. Burgoyne, Library Construction, 1897, pp. 144–146.

VIII.—MANCHESTER.

Manchester is an incredibly smoky city, with over three-quarters of a million inhabitants. Dresden, which suffers a like disadvantage in Germany, is a veritable paradise in comparison with it. We are compelled to pity the development of culture which ripens under such circumstances, and which transforms human habitations into hells. A noble citizen of Manchester, T. C. Horsfall,[a] took it upon himself to attempt to improve the conditions by both voice and pen, although there is no probability that he will be successful. I mention among others the following of his writings: The Relation of Arts to the Welfare of the Inhabitants of English Towns (1894, 26 pp.); The Government of Manchester (1895, 46 pp.); An Ideal for Life in Manchester Realizable if (1900, 24 pp.), and The Use of Pictures in Education (1902, 28 pp.). In the second paper mentioned he writes on page 10:

> I do not think that in any other country so large a part of the race has been brought in stature and general build so far below the normal stature and build of the race as has been the case in east and south London and in the poorer parts of all our large towns;[b] while the continued prevalence of drinking and licentiousness, and the rapid spread of betting and gambling show that the average mental and moral state is no better than the physical. * * * The vast Roman Empire fell for lack of men and the vaster British Empire, however numerous the British people may be, must also fall for want of men if we continue to allow the health of the bodies, brains, and hearts of the people of our towns to be sapped as they are now being sapped in a great part of Manchester.

And in the last-mentioned paper, page 4:

> The condition of the town—the condition of all large English manufacturing towns—is simply terrible. * * * Ever since I went abroad, for the first time after reaching manhood, I have felt convinced that, whatever other reasons there may be for our not being loved, the light apparently thrown on the true nature of the belief, which England professes to hold, that she is the great civilizer of the world, by what the greater part of London is and what Manchester and all other large manufacturing towns are, and are allowed by the well-to-do classes in this, the richest country in the world, to continue to be, is in itself sufficient reason for our not being loved or respected, and for our being regarded as the nation which is of all the most wishful to deceive itself and others. * * * With all that is sound in his (that is, the King of Ashanti's "poor bloodthirsty King Prempet") nature he would know that the life of an unsacrificed Ashanti is preferable to, and only nominally less civilized than, that of the Ancoats rough and of those rich persons who are willing to allow their countrymen to be Ancoats roughs.

Ancoats is a suburb to the east of Manchester and has a museum—Manchester Art Museum at Ancoats—which, in imitation of the Bethnal Green Museum in London, provides musical performances and

[a] Mr. Horsfall received the honorary title of doctor at the semicentennial celebration of the university in 1901.

[b] J. M. Rhodes showed at the meeting of the British Medical Association in 1902, that there die in Manchester 198 out of every 1,000 children, in London 154 of 1,000. See *Nation*, LXXV, 1902, p. 142.

lectures for the poor people of this section of the city and a primary school, for children from 10 to 14 years of age, in natural history, English history, and physical geography. More is done in this direction in England than in Germany, although it does not appear to me that the population is thereby any more enlightened than ours. It is rather the contrary. At all events, our school education is a better one, and this can not be brought about by influencing the adults.

All the buildings of the city are of a deep black, and this is coupled with a smoke-filled atmosphere.[a] For this reason a great portion of the population lives miles away about the town, and tens of thousands may be seen coming into town in the morning and going out in the afternoon. That the interests of museums must suffer under these unfavorable conditions is obvious, so I am the more pleased to be able to call attention here to some noteworthy features.

22. MANCHESTER MUSEUM OF OWENS COLLEGE.

Owens College was founded by John Owens, a Manchester merchant, who died in 1846. Opened in 1851, it has an endowment of $500,000. It is known as the University of Manchester, with 1,200 students of both sexes and 80 instructors, and constitutes a part of the Victoria University, which embraces Manchester, Liverpool, and Leeds, but has its seat in Manchester.[b] A million dollars was collected by subscription, and the aggregate property of the schools amounts to $3,750,000. In 1870, A. Waterhouse began the construction of a group of buildings in the Gothic style, which, as remarked under the heading of Oxford, is not well adapted for museums and the like, at all events, when it is not restrained. Mr. Waterhouse, who is one of the most noted architects of England, also designed the new town hall in Manchester, built during 1868–1877, at a cost of $4,000,000, and the assize courts, built in 1864 at a cost of $500,000, both in the Gothic style. In the town hall, which has 314 rooms and a tower 93 meters high, one is at once convinced of the unsuitability of this architecture when looking at the dark stairways and passages where artificial lights must be employed even on bright summer days. The present museum building was constructed during 1886–88. I do not give an exterior view of the structure, which is in the same style as the other buildings. Quite recently a large hall (Whitworth Hall) has been erected adjoining this, at a cost of $225,000, for which, however, the Gothic style is in every way well suited.

The Natural Science Museum of Owens College (the university), under the curatorship of W. E. Hoyles, embraces mineralogy, paleon-

[a] Mr. Horsfall also speaks, in a paper published in 1903, of the horrible filthiness of the air.

[b] A movement is now on foot to establish separate universities in the three cities named.

tology, botany, zoology, anthropology, archeology, ethnography (also numismatics), and is well administered. The large ground floor hall, 100 by 50 feet in dimensions, with side lights on the right and left and with cases at right angles with the walls, is well lighted by large windows (fig. 86). One is here again convinced that this is the only proper method of museum lighting, since the halls on the second floor, with skylights and two galleries, one above the other (fig. 87), are poorly lighted and suffer under reflections from the glass of the cases. The main stairway leads only to this story with its large rooms, 100 by 50 feet floor space, 40 feet high, while the two galleries are reached by an inside stairway (fig. 87). The Gothic

FIG. 86.—Owens College, Manchester, England, Manchester Museum. First floor.

architecture has a disturbing effect and detracts from the impressiveness of the exhibits, which it overshadows. Then again, because of the façade, a difference in height, with steps, had to be introduced in the interior, which is inconvenient. Thus in the rear of the main halls already mentioned there is a transverse hall about 72 by 30 feet in size. The terrazzo pavement is not especially suitable, since, as elsewhere, it becomes broken. Nonelastic stone floors in museums are fatiguing to visitors. The wooden cases and cabinets are hardly up to strict requirements, though generally great care and consideration has been given to the installation of specimens. So many labels have been provided for the benefit of students that this museum really, in some portions, may claim to be "a collection of instructive

labels, each illustrated by a well-selected specimen," which is what an ideal museum should be according to the oft-repeated, clever, but paradoxical and erroneous, definition by G. Brown Goode in Washington.

In cosequence of this, it has little attraction for the general public, since the scientific atmosphere of the museum is not popularly pleasing. (During 1898–99 the attendance on week days was 30 to 372; on Saturdays and Sundays, 40 to 450; and the largest attendance for the year, on Easter Monday, was 952.) Especially well represented are the lower animals. The conchological collection is noteworthy. In the ornithological department I note, among others, 10,000 skins, the famous Dresser collection, which served as a basis for his ornitholog-

FIG. 87.—Owens College, Manchester, England, Manchester Museum. Second floor and galleries.

ical works (Palæarctic Birds, Bee-Eaters and Rakes). This is well installed by itself in cabinets with drawers, but is exposed to danger from fire by reason of being housed in the attic, which is not fireproof and contains much wood. This attic has only recently been added for the purpose. The ethnographical and anthropological collection is only in its infancy (Egypt, Peru, etc.), and is as yet stingily treated, on account of lack of funds. The library of the museum comprises 4,000 volumes and has a printed catalogue. The library of Owens College has 62,000 volumes and the school of medicine has 31,700 medical books.

There are employed six trained scientific men, one printer, three assistants, and two attendants. There are no preparators, all stuffing

and the like being done outside the museum by contract, which is the practice in most English museums (including the London Natural History Museum). The annual expenses are $13,500, of which $7,500 is spent for salaries.

From October to May about 25 popular lectures are given (admission free), for the most part in the museum, principally on Saturdays and Sundays, on the subjects of archeology, geology, mineralogy, zoology, and botany, some of which are intended for children (for example On the Struggle for Existence in Nature). The total attendance at these lectures amounts, however, to only about 2,500 persons.

The museum has published the following: Reports (annual) from 1895 on, six pence; Notes (six of these have appeared since 1896, but they are only reprints of magazine articles); Scientific Guides, partly illustrated (reprints from journals), 12 of which have appeared at prices from 2 pence to 2½ shillings; Popular Guides, general, with illustrations, in two editions, six pence, briefer, a penny; altogether 34 publications, some of which are also called handbooks. In addition, the museum has published labels such as those describing the subclasses and orders of mammals (15 shillings), Families of Mammals (10 shilling 6 pence), Families of Birds (10 shilling 6 pence), Families of Fishes (10 shilling 6 pence), Coleoptera (3 pence), Worms (six pence), and also maps showing geographical distribution (100 for six pence). This undertaking is deserving of much thanks, inasmuch as it saves the expense of printing to other museums; it is unfortunate that the German museums can make but little use of these labels, since they are partly printed in English. The Dresden collection, however, some time ago procured from them and installed the labels of bird families in Latin, printed in red. It has long been my desire to arrange for duplicates of the printed labels in the Dresden Museum for transmission to other collections so as to save them the trouble of preparation. The arranging of labels for public exhibition requires much time, as they should be brief, explicit, and complete. It is unfortunate that, up to the present time, every museum undertakes this vast labor of preparation, instead of utilizing some of the work done by others. I know a German museum that practically prohibits the copying of labels for use elsewhere. The English (regardless of the Manchester Museum) and the Americans have already begun to publish some of their printed labels.[a]

For a description of Owens College in general, see The Owens College, Manchester (founded 1851). A brief history of the college and description of its various departments. Edited by P. J. Hartog. Manchester, 1900. Quarto, VIII, 260 pages, 29 plates.

[a] Reports Museums Association and Museums Journal.

The Manchester Museum of Owens College is among the leading museums of England, and has apparently a great development before it. In this insufficiently lighted Gothic building, however, it will hardly develop fully. It is now an excellently arranged study collection, and in its present quarters can remain only such.

This museum also is open daily from 11 a. m. to 5 p. m. (to students from 10 a. m. on) and on Sundays from 2.30 to 4.30 p.m., besides each first Wednesday of the month from 7 to 9 p. m. when it is lighted by electric arc lights reflected from the ceiling. It is closed only on Good Friday and on Christmas Eve.

While no attention has been paid in the Museum building to ventilation, a very notable method of ventilation has been installed in the new physical laboratory of Owens College,[a] by which no air is admitted through the windows, but is brought in from the outside through tubes over an oil bed, which clears it of dust. This may be well thought out theoretically, but does not appear to hold good in practice, and, besides, the windows do not close tightly, so that air carrying dust and soot comes in through the crevices. These windows are also arranged for opening and are opened at times. The installation is therefore imperfect. There is, however, always a thick crust of dirt on the oil, the air passing through the tubes over it with force before it enters the room. I shall revert later on to the question of air cleansing.

23. PEEL PARK MUSEUM IN SALFORD.

Manchester is divided into two parts by the river Irwell, the western portion being called Salford, with its own separate incorporation. High above a park is a good sized museum building in the Renaissance style, "for all," and a library (Royal Museum and Libraries). This was established in 1840 and was extended in 1853, 1857, and 1878. The whole is so blackened and soiled with smoke that I was necessarily most unfavorably impressed. There are a number of handbooks for sale (Art, Mineralogy, Geology, 27 pp.; Fine Arts Section: Marble Sculptures, Casts, Paintings, 32 pp.; Ethnography, 49 pp.) and a Popular Guide (8 pp.). All is done with the best intentions, but, owing to the lack of means, is of little avail. It is much more difficult in a manufacturing and commercial city like Manchester than elsewhere to impress the people in authority with the usefulness and value of good museums, so that they will grant the necessary funds for their maintenance.

[a] Described in *Nature*, October 27, 1898, p. 621.

MUNICIPAL TECHNICAL SCHOOL.

Manchester, England.

24. VARIOUS ART MUSEUMS.

WHITWORTH INSTITUTE.

The Whitworth Institute is a museum of art and industry in Whitworth Park. It contains a picture gallery, a commercial museum, and the like. It is insufficiently lighted, but is not unattractive in its interior decorations. In the basement, engravings, drawings, etc., are exhibited with excellent results by means of Luxfer prism window panes, the room being lighted by a single row of windows. I have discussed this under New York (see p. 387), and have made an experiment with them in the Dresden Ethnographic Museum. This arrangement is also utilized to advantage in the Royal Armory in Berlin.

MUNICIPAL SCHOOL OF ARTS.

[Cavendish street.]

The Municipal School of Arts, established in 1842, has a small but very tastefully arranged art collection, brought together in 1898 in a building erected by J. G. Sankey. The illumination from above is not, however, satisfactory. There are 1,300 pupils.

CITY ART GALLERY AND MANCHESTER ART MUSEUM.

The City Art Gallery and the Manchester Art Museum, in Ancoats (a suburb), I could not visit. The museum lends framed pictures to elementary schools, generally in lots of 12 at a time, in every case for a half year. It possesses over 3,000 pictures for this purpose and supplies 92 schools, but is endeavoring to fill also the wants of the remaining 215 elementary schools of Manchester. This museum, under the direction of its founder, T. C. Horsfall, has a very far-reaching usefulness. (See also T. C. Horsfall: The Use of Pictures in Education. Manchester, 1902. 13 pp.)[a]

25. MANCHESTER MUNICIPAL TECHNICAL SCHOOL.[b]

The Manchester Technical School is a very large and high structure, recently completed, of brick and terra cotta, with tasteful exterior, the main entrance in gray granite, designed by Messrs. Spalding and Cross, in free French renaissance style of the time of Francis I. It was erected at a cost of $750,000, exclusive of the ground and furnishing. The building was begun in 1895. There are 5,500 evening pupils, 150 instructors, and 150 persons employed in other capacities. As a building it is very noteworthy. All of the rooms face the street,

[a] And Handbook to the Manchester Art Museum, 81 pp., one penny, as well as What to Look for in Pictures, 1887. 24 pp.

[b] See also a description of the Municipal School of Technology, Manchester. The School Press, 1902. 27 pp. Quarto, illustrated.

and are consequently well lighted, while all corridors look out upon the courtyards. Its interior, treated primarily with regard to its usefulness, is, nevertheless, decorated with the most marked artistic taste,

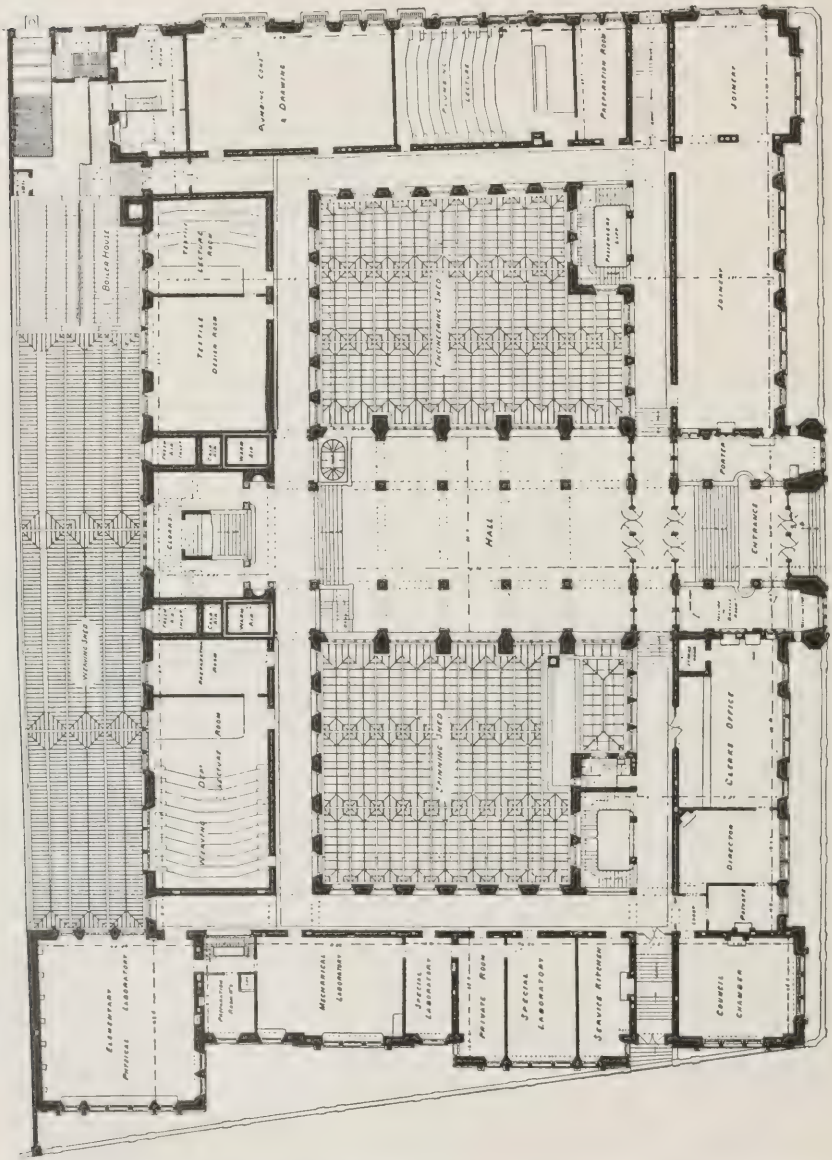

FIG. 88.—Municipal Technical School, Manchester, England. Plan of first floor.

and I note particularly the application of glazed bricks of a fine dark-brown color (Burmantoff's glazed bricks from the Leeds Fire Clay Company Limited, in Leeds), which are also employed at the base of the exterior of the building. In the English climate, which is mild as com-

pared with that of Germany, these glazed bricks stand exposure to the weather, and I believe that they would also stand our more vigorous winters, since they are likewise used quite extensively in America, where the winters are even more severe than with us. On the interior brighter, light-colored glazed bricks are used, but for economical reasons they do not extend the entire height of the rooms and corridors, the upper portion being unglazed. The fireplaces are made of Burmantoff's faience, supplied by the company already mentioned. Colored glazed bricks are used in Manchester and elsewhere in England to a considerable extent in monumental structures; at all events, much more than with us. In many cases exceedingly fine effects are thus obtained, as in Manchester, for example, with the light-green and light-yellow brick from the Pilkington Company, in the building of the Tootal Broadhurst Lee Company (Limited), 56 Oxford street, and in some of the large new bank buildings in the neighborhood of the town hall (National Provincial Bank of England, Merchantile Bank of Lancashire, both in York street, the latter furnished by the Malkin Company). I found these very attractive when of uniform color, and there are also some that are really tasteful, in a simple manner ornamented with color. The technique of glazed brick has certainly progressed well in England. It is well to advise every architect who has a museum building to design to examine into these things. I obtained two illustrated catalogues and price lists from the following firms: The Malkin Tile Works Company (Limited), Patent Encaustic Tile Manufacturers, in Burslem, Staffordshire, 62 Market street, Manchester; and Pilkington's Tile and Pottery Company (Limited), Clifton Junction, near Manchester, 37 Cross street, Manchester (these, in part, illustrated with some very artistic prints from drawings by Walter Crane, M. Mucha, J. R. Cooper, Lewis F. Day, John Chambers, C. F. A. Voysey, J. H. Rudd, and others). Another large factory is that of Doulton & Co. (Limited), Lambeth, London. I believe these glazed bricks may be very well utilized in the interior decoration of a museum. In collections, however, in which many objects must be hung on the walls, wooden appliances are needed, which are easily made. In the technical school in Manchester very beautiful, not overdecorated colored glass windows are also employed.

Of most decided importance is the method of ventilation employed in the new building of the technical school in Manchester. It is the same as referred to in my report on Chicago, see p. 484, and which rests upon the principle that only screened (washed and cleaned) air, permeated with steam and heated *ad libitum*, is brought into the building ("plenum system"). This building is one of the few in Europe (some others will be mentioned in the course of this report) that has introduced this important method, the only proper and necessary

one for museums, and I deem it of the utmost importance that only this be employed in all new museum buildings. In the technical school, moreover, all the windows can be opened without any unclean air penetrating from the outside, since the pressure of the air in the interior of the building is always greater than that from without. I inspected the great shafts and ventilators (see fig. 88). It is here applied in a very elaborate and expensive installation, such as is required for sanitary purposes in a largely attended school, but it is also to be recommended for museums and libraries for the same purposes, and especially to preserve the collections from dust and other damage. In such an exceptionally smoky city as Manchester this installation is even of greater importance than elsewhere.

The new technical school is in the first rank in every respect. The building cost the city $1,250,000. One of the highest American authorities on this subject (Edward Atkinson, in Boston, of whose labors I shall make mention in the continuation of my American Studies) recently referred to it in the following words:[a]

> I may add that I found in Manchester the most complete and well-devised building for technical instruction in science, including special departments for the textile arts, that I have yet seen.

Before the construction of this school a commission inspected the technical schools, institutions, and museums in Germany and Austria and published a report in 1897, in which, among other things, the following occurs (p. 16):

> There are not elsewhere in the whole world such splendid collections as are to be found in the British Museum and in South Kensington; but then you can hardly go into a continental, and certainly not into a German, town, even of minor importance, without finding a beautifully ordered and representative museum, suited to the needs of the city and its neighborhood, and often not one merely, but another of a quite special character should circumstances require it.

I believe, however, that in our German museums there is much that is capable of improvement.

26. JOHN RYLANDS LIBRARY (DEANSGATE).

The John Rylands Library was donated to the city as a free library by Mrs. Rylands in memory of her late husband, and opened in 1899. Built of red sandstone in the Gothic style, in 1890, by B. Champneys, it cost $1,500,000. It contains 70,000 volumes, valued at $1,250,000, including[b] perhaps the best collection of incunabula in existence. It is the valuable library purchased by Mrs. Rylands in 1892 from the Count Spencer in Althorp, comprising the Althorp Library, together with other treasures. The library has at its command for the pur-

[a] Boston Manufacturers' Mutual Fire Insurance Company Circular, No. 79, November 5, 1901, p. 6.

[b] Library Association Record, I, 1899, p. 567.

JOHN RYLANDS LIBRARY.
Manchester, England.

chase of books the sum of $24,000 annually, and from this fund the increase approximates 10,000 volumes yearly, but as the building is so arranged that it can scarcely be extended, and as it is already filled, they hardly know how to meet this difficulty.[a]

A more attractive building is hardly imaginable, nor one less suited for a library, in which the readers must be supervised. Disregarding all the experiences gained by libraries and all library principles, the architect, following the wish of Mrs. Rylands, designed a magnificent Gothic structure similar to the library of Mansfield College in Oxford. The entrance hall is a perfect forest of columns, uncommonly attractive artistically, but entirely useless, for the hall is so narrow and dark that it must be artificially lighted in the daytime.[b] The entire building is in the style of a church, and, imposing as it appears in its main nave (23 by 160 feet long, 50 feet high), in its side chapels, so to speak, or alcoves, in its galleries and transepts, it is so dark that at 3 o'clock in the afternoon in September electric lights had to be turned on throughout. The books are not arranged in accordance with modern library methods, as one might expect, but in cases, the same as has been done from olden times, only the reference library being directly accessible to the visitor. These cases, built of oak, with brass door frames and plate glass, are delightful. They close perfectly and are dust proof as long as the wood does not warp. Such an ideal and magnificent arrangement is certainly not to be found in many places; but, as I have already remarked, the library is full, and, in view of the difficulty of adding to this building, it will in the course of time be necessary to abandon this elegant installation. The plate-glass doors of the cases are 10 feet high and 2 feet wide, and in the grooves are rolls of velvet with an inclosure of wool to make them dust proof. The librarian is of the opinion that in consequence of the complete air-tight closing of the cabinets, the majority of the costly books become moldy, and it is therefore necessary for him to ventilate the cases by leaving the doors open from time to time. I do not share his opinion[c] and I believe,

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[a] F. J. Burgoyne, Library Construction, Architecture, Fittings, and Furniture, London, 1897, p. 128, says, in the chapter The Architectural History of the British Museum Library: The history of all library architecture is pregnant with two especial morals—the need of building from the first upon some well-considered plan, so prepared as to admit of harmonious development in the future, and the necessity of making extremely generous estimates in respect of space. Unless in the case of libraries devoted to special classes of books, or of branch libraries controlled from the parent institution, or of libraries where books no longer in general demand are systematically sold off, space, unless the most effectual measures have been taken at the very outset, must become the librarian's master. The architectural history of the British Museum is to a considerable extent a history of struggle against circumstances created by neglect of these elementary principles.

[b] See my preceding remarks on the dark stairways and passages in the townhall designed by A. Waterhouse.

[c] See the remark, p. 461.

moreover, that the books mold because the building was occupied too soon and is not yet dry. Everywhere, even in the small workroom of the librarian, it smelled musty and gave the impression that the building is damp. I attribute the molding to this, and it may require years before the building will be thoroughly dried out in the moist English climate. In addition, the cases are so built in that it is impossible to provide air holes for them, but at all events it is important to definitely decide whether books are damaged in securely closed cabinets. I took occasion to inquire about this in the Library Sainte Geneviève in Paris (see p. 594) where I found the valuable incunabula, Aldines and Elzevirs in cases, but there the opinion is that the books are not injured by being kept in this manner. The wooden cases, however, do not close so tightly, and the library is 50 years old; furthermore, Paris is not as moist as Manchester. In the museum under my care we have had books since 1897 in air-tight iron cases, which give not the least indication of damage up to the present time. A number of experienced librarians whom I have asked, state as their opinion that a book is not damaged by being kept in an air-tight case unless the book be a freshly bound one, in which case it should be dried out for from one to two years before it is stored in this manner; yet, in the John Rylands Library

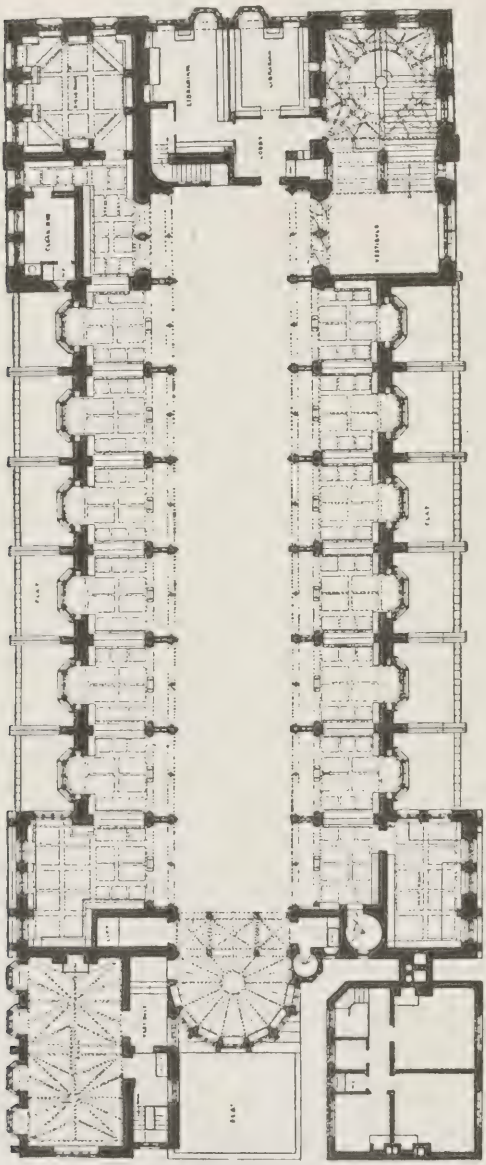

FIG. 89.—John Rylands Library, Manchester, England. Plan of second floor.

the very old bindings suffer in the same way. Books securely inclosed will not be more liable to damage than the stuffed skins of animals, and though the latter are thoroughly poisoned, this is not the case with insect collections. At any rate, at the Dresden Museum, where the insect collection is installed in air-tight iron cabinets, no injury has been done to it up to this time.

Still more interesting than this subject is that of the ventilation. The system installed is as in the technical school, so that only cleansed air is introduced into the building. Here the windows are arranged so that they can be opened; but too little pressure has been allowed for the incoming or outgoing air, and in consequence the rooms are stuffy. There appeared to be no remedy for this except to make casements or valves in the windows to let the air in from outside, and consequently the entire costly ventilating apparatus is rendered superfluous.[a] This difficulty could doubtless be remedied if the flues were altered, but only with great difficulty, since all of the tubes and shafts are so buried in the stone in the Gothic structure that it could not be accomplished without greatly damaging the entire building. As a result the ventilating arrangement was abandoned and unclean air is now admitted from the outside into this "jewel box," so that it will soon be damaged by smoke and soot, and the costly books with their precious old bindings will suffer.

Hot-water heat is employed, and the air which is forced in is strained through cotton. It is not, however, washed, though previously warmed as it passed over the hot pipes. An electric-light system throughout dispenses with the use of gas, which is so detrimental to books.

The building is fireproof, constructed entirely of stone, and almost entirely vaulted. The floors have two fireproof layers with a space between, though covered with oak wood. So much wood has been introduced into the building itself, exclusive of the wooden cases, that a fire starting on the inside and not immediately detected might lead to the destruction of the valuable books. If the cases were of iron, even though the excellent American library installation should not be adopted, and so much wood had not been utilized in the interior decorations for the purpose of increasing the æsthetic effect, this danger would have been obviated. The location of the building in the center of the city, closely surrounded by houses, makes the danger still greater. The architect belonged to those who have foremost in their mind the building itself and not its purposes and contents. How justice can be done to the people and to the objects for which the building is designed, that is another question.[b]

One of the special features, besides the collection of 2,000 rare block-printed books and first impressions (nearly all antedating 1480), is that

[a] See p. 484 under Chicago.

[b] A brief description of the building is given in *Library Association Record*, 1, 1889, pp. 686–688; the *Builder*, 1900, pp. 78–81, No. 2973.

of the Bibles (said to be second only to the Bible collection of the British Museum). Further, the collection of Aldines (over 800) is understood to be the most complete; and a collection of the earliest and rarest books relating to America and the early explorations in general should be mentioned. It is used very little as a purely scientific library in the great commercial city, and mostly by clergymen. It is open on week days from 10 a. m. to 6 p. m., Tuesdays and Fridays also from 6 a. m. to 9 p. m., Saturdays only until 2 p. m., and is closed on Sundays and on ten week days during the year. A 3-volume printed catalogue (1899) and various printed section catalogues have appeared.

In England, as in America, organizations, societies, etc., are much more privileged than with us in visiting public institutions and in being shown through them. So it happened that on the day of my visit a society of young men and women with religious tendencies called or was invited on Saturday afternoon at 3 o'clock, at a time when the library is ordinarily closed. Several hundred persons presented themselves. They assembled in the large, elegant, paneled lecture room, and the director made an address in which he explained to them something concerning the history and the contents of the library and instructed them in the use of the books. All that he could say, however, in this connection was that, since the library was a scientific one, they would find help and encouragement for their religious interests only in the large collection of Bibles, and he advised them to use this section. The society was then permitted to wander at will about the large library. The visitors were attended by the director and other officials, and the noteworthy and valuable things were pointed out. All parts of the building were well lighted with electricity. This has assuredly the advantage of broadening the horizon of a class of people who have no conception of such a magnificent installation as a good library, and of inspiring one or another of them to go into the subject more profoundly.

27. FREE REFERENCE LIBRARY.

There were in Manchester also many other things to learn and to report upon,[a] but my time was limited and the sojourn in this factory town but little pleasing.

So I did not visit the Free Reference Library in King street, which has been housed since 1878 in the old town hall (constructed in 1823–1825), which contains 124,591 volumes, and in which during the last year 360,176 readers have consulted 441,074 volumes. The city would long ago have undertaken the establishment of a new up-to-date library, since everything is overcrowded, were it not for the fact that a debt of $25,000,000 was assumed in the construction of the

[a] See C. W. Sutton: Some of the institutions of Manchester and Salford, *Library Association Record*, 1, 1899, pp. 550–563.

ship canal between Manchester and Liverpool, besides large expenditures for electric light and trams. F. J. Burgoyne[a] says:

> It is strange that the town which was the first in Britain to obtain parliamentary powers to establish a public library should be content with a makeshift building as a home for its splendid collection of books * * * Manchester has lagged behind * * *

This library has five branch reading rooms and distributes at thirteen places in the city books for reading at home.[b] It has altogether 292,167 volumes, which were used in the aggregate during the last year 2,181,596 times, a daily average of 6,128. There were taken home 1,022,511 books by 46,456 persons provided with cards, and 657,121 in the boys' rooms, five-sixths of whom were Sunday visitors. Since the number of readers in the newspaper rooms aggregate 4,117,684, we arrive at a total annual patronage of 6,138,996 persons. Even if we omit the 4,000,000 newspaper readers, there still remains a formidable number, and the proper administration of all this is certainly a remarkable performance. The annual expenditure by the city for the library amounts to $108,000, of which $44,000 are allotted to salaries and $25,000 for books and periodicals.[c] We must not overlook the fact that in the large number of books used as stated, of the 1,022,511 lent for home reading, 841,198 related to fiction, of which there are 62,915 volumes. In this respect all these libraries serve the same purpose as our German private circulating libraries, except that with us a fee must be paid, whereas with them the service is free of charge (compare also with the above what I have said in connection with the Chicago Public Library). In the Reference Library, on the other hand, there is no fiction, but only books on theology, philosophy (9,638 volumes), history, biography, travels (29,685), politics and trade (21,503), arts and sciences (22,422), literature (31,133), and patents (7,064). The consultation of 441,074 books by 360,176 readers in the last year is, as already stated, not only noteworthy from a technical library standpoint, but it may also be taken for granted that it has an influence on the education of the people of the city. At any event, nowhere with us in Germany are so many good books read by the people. The library has a printed catalogue and publishes periodical lists of its acquisitions. The "Manchester Public Free Libraries" were established in 1852.[d] Of the other libraries of Manchester may also be mentioned the Portico Library, with 80,000 volumes (English literature, English topography, books of the eighteenth century). All in all, the public libraries of Manchester comprise 800,000 volumes.

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[a] Library Construction, 1897, p. 171.

[b] The celebrated Boston Public Library has now (1903) 156 agencies for the delivery or reading of books.

[c] See Forty-ninth Annual Report to the Council of the City of Manchester on the Working of the Public Free Libraries, 1900–1901, 27 pages octavo.

[d] See also J. J. Ogle, The Free Library, 1897, pp. 158–165.

IX.—EDINBURGH.

Edinburgh, a city with more than 300,000 inhabitants, is a paradise in comparison with Manchester, but is itself more or less begrimed in consequence of the location of the great railway station in the center of the city. Were it not for this, Edinburgh, on account of its picturesque location, would perhaps rival the finest cities of the world. The town has only a few factories.

28. UNIVERSITY OF EDINBURGH.

The University of Edinburgh, with over 2,800 students and 170 instructors,[a] is located in a stately building erected at the close of the eighteenth century. A dome has since been added (Plate 38). The

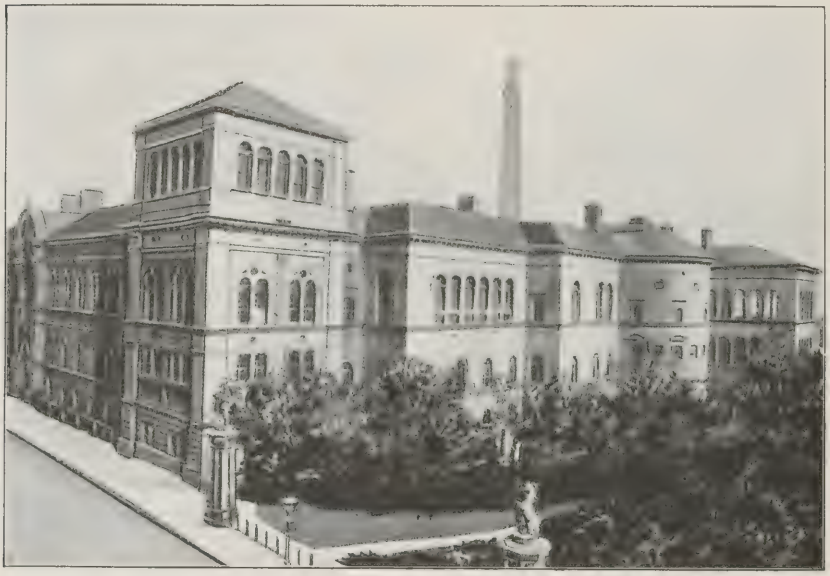

FIG. 90.—University of Edinburgh. Part of new university.

library, at the left, with 210,000 volumes, has an antiquated installation, but the main hall makes a magnificent impression. All of the public buildings of Edinburgh are conspicuous for their massiveness and strength. In this respect the students' clubhouse and the music school in the group of the newer university buildings (fig. 90) are noteworthy, and especially among these the Aula (McEwan Hall), which cost $550,000, is one of the largest and finest buildings of the kind that I know.[b] The new university buildings are about ten minutes distant from the old university, adjoining the school of medicine, opened in 1844.

[a] Leipsic, in the half-year 1902 had 4,100 students (of which 439 males and 53 females were only "auditors") and 215 instructors.

[b] All of these buildings are not shown in fig. 90.

UNIVERSITY OF EDINGURGH.
Old University.

ANATOMICAL MUSEUM.

I could not inspect everything, and the Museum of Comparative Anatomy, under Sir William Turner, possessed most that was to my interest to visit. In 1720 Alexander Munro, then only 22 years old, was professor of anatomy here; his son, Alexander Munro 2d, occupied the same position for fifty years, and Munro 3d until 1846. He was succeeded by John Goodsir, and the latter in 1867 by W. Turner, all anatomists of world-wide reputation. The collection was founded by Munro 2d, and is unusually valuable. Turner, with R. Rowland Anderson, the architect of the entire School of Medicine, planned the new museum in 1876. It was designed and executed after the pattern

FIG. 91.—University of Edinburgh. Anatomical Museum.

of the Royal College of Surgeons in London (see p. 528), and was completed in 1885. It cost $57,000, and, in addition, its interior installation (cases, etc.), cost $42,000. It comprises a large hall, without columns, provided with a skylight, and two galleries, one above the other (fig. 91), its interior dimensions being approximately 37 meters long, 13 wide, and 14 high. The stairs to the galleries, one flight at each end, are narrow and steep, as in the Royal College of Surgeons in London; they are used only by students, for the great public visits the museum but little. The skylight consists of a horizontal layer of frosted glass panes, and above this a glass roof with a grating along the middle and inclined sides. The space between these two sets of windows is so

high that one can walk upright in it to clean the glass. The construction of this hall indicates in one respect an essential advance over the halls of the Royal College of Surgeons in London, which as already stated are too dark. Windows here are inserted on the ground floor, so that the galleries do not shade the hall below, as in London. The upper gallery has, besides, a floor of hammered glass. This scheme of supplemental side lighting is very essential where there are skylights, but is in no way to be preferred to the lighting of large halls from two long sides, as it has many disadvantages. For instance, the reflections of the skylight on the desk cases along the rail of the galleries is very annoying, as is true everywhere in similar structures (Hamburg, London, etc.). The cases on the galleries are shallow wall cases, and those of the hall itself are mostly free-standing ones, at right angles to the window piers. These are consequently excellently lighted, while, on the contrary, the wall cases on the narrow sides of the hall are dark. Though the superb mahogany cases, with plate glass, are on the whole very impressive when one enters the large hall, they do not, with their massive framework, answer to strict modern requirements. Furthermore, they do not close tightly, and the collection, therefore, must be cleaned yearly throughout. There are horizontal cases near the windows. The shelves in the cases are of plate glass or of iron lattice-work, which is less attractive. The museum contains on the main floor comparative-anatomy preparations. The upper gallery is devoted to pathology, as in the Royal College of Surgeons in London. Doors lead from the galleries into the several departments of the medical school. The floor of the hall is on the level with the adjoining laboratories, preparators' quarters, the dissecting room, and lecture hall. Everything is excellent and spacious. The ample space between the cases, from the floor to the roof, is occupied by a rich collection of whale skeletons, making a striking picture. They are suspended by chains, which appear less massive than the iron rods employed in the Royal College of Surgeons in London.

At one end of the great hall there is a room about 23 feet long, 16 feet broad, and 20 feet high, with a gallery for the excellent series of racial skulls; among them, for example, over 70 Australian skulls. This collection rivals in importance that of the Royal College of Surgeons in London. There is also an old phrenological collection, phrenology having been zealously cultivated in Edinburgh at the time of Gall.

In general, this museum, on account of the limited force of employees, as occurs in many English museums, is not sufficiently cared for or labeled. It ranks, however, among the best in the world, and Sir William Turner has made a worthy monument for himself.[a]

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[a] Recently (1903) Sir William Turner has been elected principal of the University, and Prof. D. J. Cunningham of Dublin has become his successor.

29. MUSEUM OF SCIENCE AND ART.

The Museum of Science and Art (since 1904 the Royal Scottish Museum), which from its size and variety might properly have been mentioned before the Anatomical Museum, is an old one. It was founded toward the close of the seventeenth century, when the renowned naturalists, Andrew Balfour and Robert Sibbald, laid its foundation. Sibbald printed, as early as 1697, a catalogue of the collection of minerals, stones, metals, vegetable products, animals, art objects, manuscripts, and books. In 1854 the present location was purchased for $35,000. In 1861 the new, stately building was begun after plans by Fowke. In 1866 the first portion, in 1875 the second portion, and in 1888 the last portion, was completed. It is the National Museum of Scotland, is supported by the state (Scottish Education Department), and is free of access to the university professors for

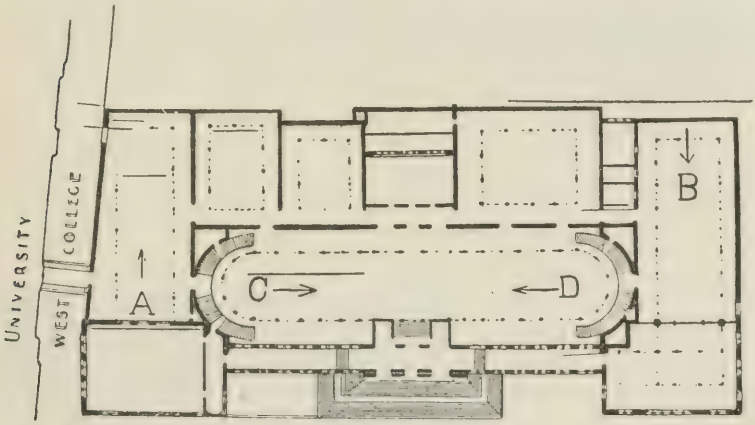

FIG. 92.—Museum of Science and Art, Edinburgh, Scotland. Plan of first floor.

purposes of instruction. The building immediately adjoins the new university, and opposite stands Heriot-Watt College, an institute for instruction in technology, natural science, and art. Now (since 1900) F. Grant Ogilvie is the director of the whole,[a] and R. H. Traquair (since 1873) the curator of the natural science department. There are 30 officials on its roster. In the manner of the South Kensington Museum, in London, it combines art, industry, and technology, and in addition, the entire natural sciences, making a grand whole. It is divided into the following departments:

1. *Decorative art:* Specimens of ancient, classic, mediæval, and renaissance sculptures, especially as applied to architecture; the indus-

[a] Recently (1903) Mr. Ogilvie became principal assistant secretary of the board of education in London, and was succeeded by Prof. J. J. Dobbie as director in Edinburgh.

trial art of Europe from ancient to modern times, ethnographical collections, Persian and Indian collections, Chinese and Japanese collections, ancient Egyptian and Chaldean arts, furniture and decorative woodwork, casts of architectural ornament.

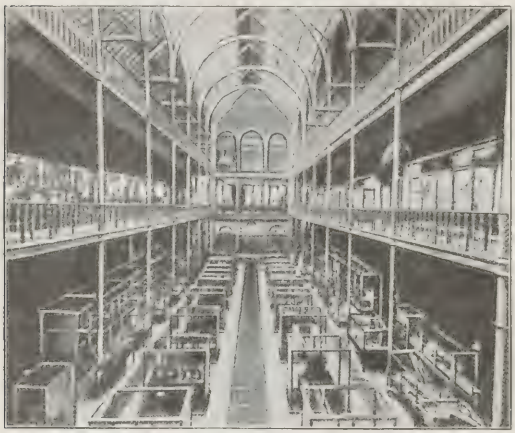

FIG. 93.—Museum of Science and Art, Edinburgh. West hall (engineering section).

2. *Technology:* Mineral, animal, and vegetable, chemical products and manufactures; economic botany.

3. *Engineering:* Civil engineering, mechanical engineering, models of ships and marine engines, guns and gunnery.

4. *Natural history:* Zoology, geology, mineralogy (geology and minerals of Scotland separately represented).

5. *The library:* Over 12,000 volumes; patents.

The museum is free on five days of the week from 10 a. m. to 4 p. m., Saturdays from 10 a. m to 10 p. m., Wednesdays also from 6 to 10 p. m., Sundays from 2 to 5 p. m., on which account a large portion of the collection must naturally suffer. The building consists of a spacious hall with skylight and two galleries—one above the other (figs. 95 and 96) and with ten large adjoining rooms partially supplied with skylights and galleries. It measures in exterior 433 feet long and 206 feet wide, and has 122,000 square feet of exhibition floor space. It is in some parts insufficiently lighted and has the defects of similar buildings. The cases are of wood with clumsy framework, and are black. To make them dust proof, velvet strips have been placed between the frames and the doors, but without grooves, and then the doors are screwed on to the outer framework; besides being locked up at several places.

FIG. 94.—Museum of Science and Art, Edinburgh. East hall (natural history).

To open them, one must get a ladder, and then with a screw-driver unscrew them in several places. No attention is paid to this inconvenience, however, since they are not accustomed to anything better, and they even regard this method of installation as an advance on that of other museums, since it prevents the warping of the wooden framework and makes the cases dust proof, which it evidently does when the frames are screwed on. Notwithstanding all this, the cases and doors are quite small. Three hundred and fifty running feet of such cases were completed and installed in 1899 alone.

FIG. 95.—Museum of Science and Art, Edinburgh (art).

The labeling of the Department of Art and Industry is after the pattern of that of the South Kensington Museum. In the great Natural History Department, which is by no means insignificant and which fills four great skylighted halls and six galleries (3 series of two galleries, one above the other), I did not notice any features deviating from the customary ones. Throughout the museum there is by far too much exhibited for the great public, and, in consequence, this not only tires the visitor, but the exhibits are damaged seriously by being constantly exposed to the light. This matter is sufficiently considered in but few museums of the world.

FIG. 96.—Museum of Science and Art, Edinburgh (art).

But I can not properly do justice to these large and extensive collections in a brief space. I found nothing that was directly worth imitating or particularly useful in planning for a new structure. The ventilation was primitive and the building was not adequately fireproof.

A not unimportant ethnographic collection of over 10,000 specimens is remarkable, with more than one valuable old specimen: Benin

bronzes, too, are represented. The order and labeling was not satisfactory, but a new installation was just going on.

The museum contains also loan collections from the South Kensington Museum in London. It was visited in 1901 by 375,179 persons, half of whom attended during the evening.[a] The opening of the museum on Sundays begun only with April 1, 1901, and, on account of its departure from custom, aroused much opposition; but Sunday opening has since been introduced in Glasgow. The average attendance on Sundays up to the present time has been 1,297 persons[b] (in London, 8,500; in Dublin, 5,000, in the corresponding museums). In 1897–98 the annual expenditure exceeded $75,000.

30. NATIONAL MUSEUM OF ANTIQUITIES.

The National Museum of Antiquities was founded in 1780 and has belonged to the nation since 1851. The new building, by R. Rowland Anderson, costing $250,000 and very notable and attractive in its exterior, was completed in 1890 and was a gift from John Ritchie Findlay. It is in the comparatively broad Queen street, in close proximity to other houses. It is built in the Gothic style, not adapted for housing collections, and in parts is insufficiently lighted. The director, Dr. Joseph Anderson, himself regrets this, as well as the many other defects of the building. I mention it only for the purpose of calling attention to the fact that museum buildings are almost universally badly planned, because the architects do not seek, as they should, the advice of experts. Unfortunately there are but few experts in such matters.

The building is of brick, which is treated on the interior somewhat too roughly to be attractive. Light is obtained from both long sides, but the Gothic windows admit too little. It is fireproof; without proper ventilation; and heated by steam. The collection of antiquities occupies the right wing of the building; the left contains the national portrait gallery and a collection of casts and other objects relating to art. The center of the building is occupied by a large entrance hall (with paintings), which takes up much room. The Museum of Antiquities consists of a very comprehensive, valuable, and attractive prehistoric and historic local (Scotch) collection, excellently arranged in chronological order. The upright and horizontal cases are primitive. The interior furniture cost $20,000. There is a considerable library in a hall, lighted from above; also a small ethnographic collection, with valuable objects from the South Seas, some of which are old. The building is open daily from 10 to 4; on two days of the week

[a] During 1902 there were 441,370 visitors, 148,796 of whom came during the evening.

[b] During 1902: 1,501, together with 78,027; 1,165 on week days—together, 214,547.

there is an admission fee of six pence; it is closed on Mondays. The number of visitors yearly is about 20,000. A most excellent handbook is the catalogue of the National Museum of Antiquities of Scotland, 1892 (1 shilling), 380 pages, 752 illustrations. An annual report is published in the Proceedings of the Society of Antiquities of Scotland. The museum has not sufficient means at its disposal.

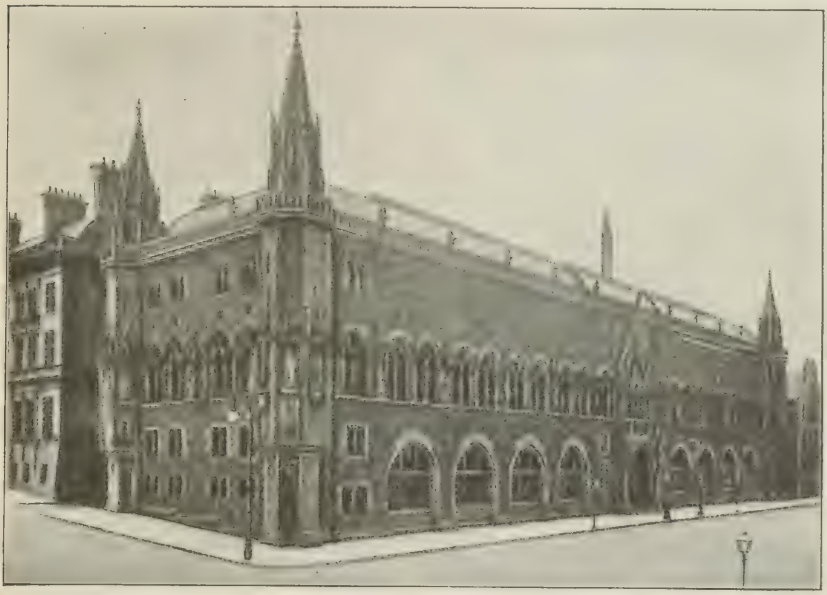

FIG. 97.—National Museum of Antiquities, Edinburgh, Scotland.

31. VARIOUS OTHER MUSEUMS.

I mention, in addition, the National Gallery, with a considerable collection of paintings, poorly lighted from above; the Royal Institution, with a collection of casts; the City Museum; the Fine Art Museum, in the university; and the Museum of the Royal College of Surgeons. These establishments, excepting the first named, I omitted to visit, for I was told that they were not important and, moreover, other sights of interest in Edinburgh completely occupied my time. I beg to mention in closing, however, the magnificent Botanical Garden, with its splendid conservatories, containing, among other things, a collection of pitcher-plants (Nepenthaceæ), of surprising beauty and abundance.

The administration of the Edinburgh museums will undoubtedly receive a great impulse from the gift of Andrew Carnegie (born in Scotland in 1837 and emigrated in 1848, with his family, to America), who donated $10,000,000 to the Scotch universities (as a first installment) for the "advancement of education," a portion of which dona-

tion may be devoted to the promotion of scientific research through the establishment and equipment of museums.[a]

X.—GLASGOW.

Glasgow is a seaport and manufacturing city, with upward of 1,000,000 inhabitants. Its street life is imposing; it is not so begrimed as Manchester, but still it is smoky to a very considerable extent. In Kelvingrove Park stands the great university building erected in 1870, by G. G. Scott, at a cost of $2,500,000 (the university was founded in 1451), in the early English style with later Scotch-Flemish features. The building is 590 feet long and 321 feet wide, with a tower 328 feet high. The library contains 180,000 volumes, and there are 2,500 students and 60 instructors. The annual expenditure for the university is $300,000. Inasmuch as I was informed that its collections are not very noteworthy, I did not inspect them, especially since the international exhibition in the same park fully occupied my time. My chief interest lay in the entirely new Museum of Art and Science, opened in 1901, and temporarily occupied by parts of the exhibition.

32. CORPORATION MUSEUMS AND ART GALLERIES.[b]

During the exhibition the building contained mostly loan collections, but at its close the not unimportant gallery of paintings, the Corporation Art Industrial Museum, and the Natural History Museum were installed there.[c] This natural-history collection at the time of my

[a] Andrew Carnegie earned at the age of 12 years $1.25 a week as spooler in a cotton factory; then he became fireman in a factory; then telegraph messenger; in his fifteenth year a telegraph operator, with a salary of $25 a month. At the age of 20 he became secretary to the director of a large railway; at 25, a superintendent of military telegraphy of the Federal Government; at 28, the owner of an oil well; at 30, a builder of iron bridges; at 45, the "steel king." It is said that he possesses a fortune of $300,000,000, but has determined to give away his entire property in order to die "poor." He spends his summer in Skibo, Scotland. (See further mention of Mr. Carnegie and his gifts on previous pages.)

[b] It is noticed that it is intended to change the name to Art Palace. We also find it styled in various ways—as, Corporation Art Gallery and Museums, New Art Galleries and Museum, Corporation of Glasgow, Museums and Art Galleries, Glasgow Art Gallery and Museum (Kelvingrove), Corporation Galleries, etc. The former Kelvingrove Museum had the following divisions: Fine-art section, ethnographical section, archeological section, technological section, local-history section, natural-history section, and book section.

[c] I have indicated on the plan of the ground floor (fig. 98) the present distribution of the collections. In the second story there are only paintings and art objects (see *The Museums Journal*, I, 1902, p. 317). The director expresses his regret (on page 324) that the natural sciences are not properly cared for, the very limited space affording no opportunity for a strictly systematic arrangement and being cut up too much. It is certainly unfortunate that in an entirely new building these difficulties must already be encountered.

CORPORATION MUSEUMS AND ART GALLERIES.
Glasgow, Scotland.

visit was, for the purpose of preparation, partly stored in the cellar of the new museum, so that I saw little or nothing of it. Earlier years are covered by the Annual Reports: Corporation of Glasgow (parks

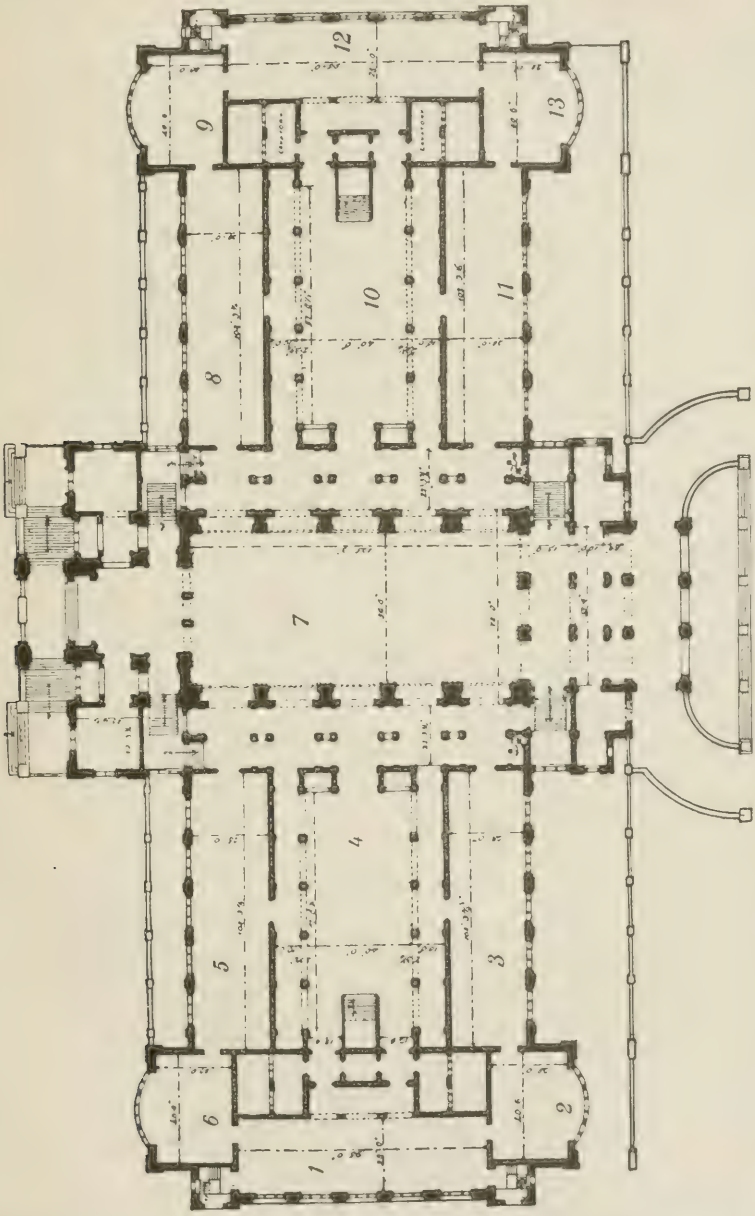

FIG. 93.—Corporation Museums and Art Galleries, Glasgow, Scotland. Plan of first floor. 1–3 technology, 4 naval architecture and engineering, 5 archeology, 6 local antiquities, 7 sculpture, 8–10 zoology, 11 geology, 12–13 ethnology.

department): museums and galleries. For example, report for the year 1899, 16 pages. The Natural History Museum was visited in 1899 by 232,000 persons.

The director of the whole is now J. Paton and the curator of natural-history section is J. M. Campbell, in connection with which section an entomologist is employed as an assistant. The superintendent

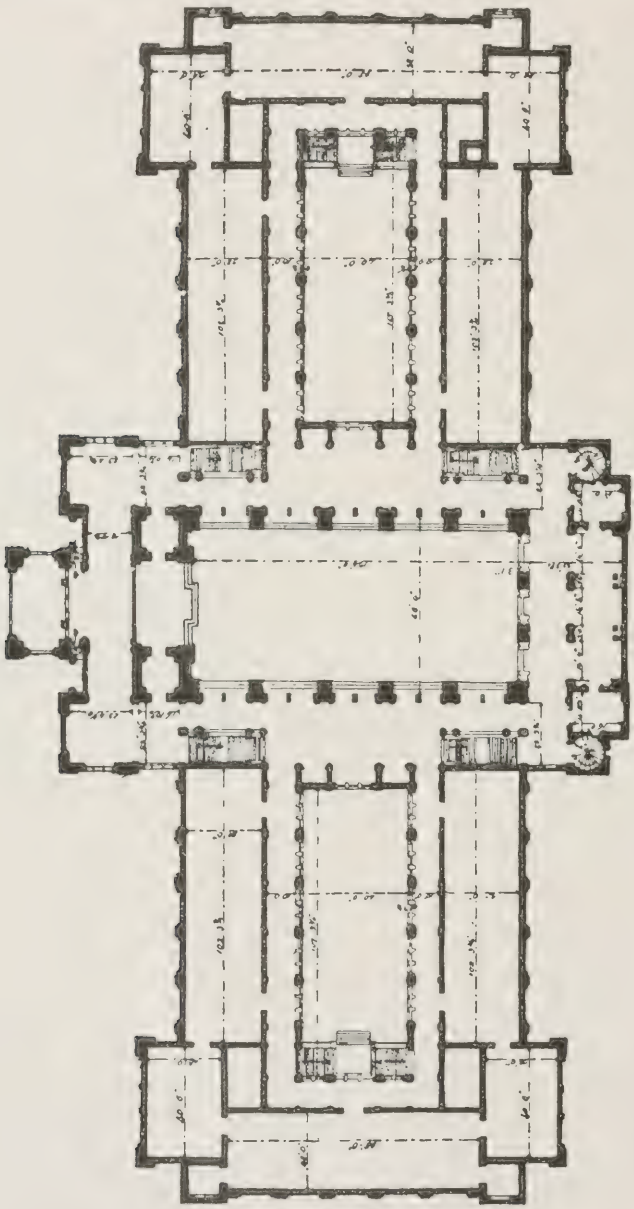

FIG. 99.—Corporation Museums and Art Galleries, Glasgow, Scotland. Plan of second floor. The right wing is used for modern pictures, the left wing for the old masters, and the center for art in general.

of the building, who gave me the most detailed information concerning the new structure, and to whom I am therefore particularly indebted, is H. Cornish.

The new building (Plate 39), by J. W. Simpson and E. I. M. Allen (of London), begun in 1893, is decidedly cumbrous[a] though effective in its exterior. In the interior it is also richly decorated, but not too much for its purpose. It is of red sandstone in the French Renaissance style, and is fireproof. The chief artistic decoration is by G. Frampton. Sir Walter Armstrong, director of the National Gallery in Dublin, sharply criticised[b] the selection of red sandstone instead of white, since the red stone, on account of the smokiness of Glasgow, will soon become completely black. The architect of the John Rylands Library in Manchester (see p. 548), on the contrary, maintains that the red sandstone withstands the effects of the smoke better than the white stone. I believe that the difference, if any, is scarcely perceptible. It would be a blessing if all of these cities were less smoky. The building is approximately 492 feet long and 164 to 278 feet wide. It has a stately main hall with galleries 137 feet long, 62 feet wide, and 88 feet high, of cream-colored sandstone; and two lateral halls with skylight and galleries 110 by 65 feet. The six lateral and intersecting halls of the ground floor are lighted from the side; the six of the second story from skylights. They are (approximately) 110 feet long and 30 feet wide; those of the second story occupied by the art gallery, in the opinion of Sir Walter Armstrong (see above), are too low. There are four corner pavilions in each story, the upper ones with skylights, making the ground plan quite diversified. Six stairways lead to the second story. Above the southern front hall there is another large hall in the third story. The lighting arrangements are good, with brilliant electric illumination in the evenings. The many towers, some of which are 186 feet high, are useless, and constitute a very questionable ornamentation to the building, since it lacks repose. The proceeds of the Glasgow Exhibition of 1888 (nearly $250,000) was the basis of the funds from which the cost of the building was defrayed. To this were added voluntary donations (almost $375,000), and this sum not being deemed sufficient, the city undertook the construction of the building, which cost over $1,250,000. The proceeds of the Exhibition of 1901 ($500,000) will be devoted to the purchase of pictures.

I would have little reason to dwell longer on this new museum, which is only a more or less slight departure from the usual pattern.[c]

[a] Plate 39 was taken during the Exposition, for which reason we see various kiosks, pavilions, etc., which do not belong to it.

[b] *Scots Pictorial*, June 15, 1901, p. 181.

[c] Sir Walter Armstrong characterizes the ground floor of the building "more successful than anything else of the same kind in Europe." I grant that it is magnificent, but I doubt if it deserves so great a commendation. He remarks at the close of his paper: The Glasgow Gallery is incontestably the finest in Europe outside the great capitals, and the director, J. Paton (the *Museums Journal*, January, 1902, p. 315), goes so far as to say: Glasgow can boast of having the most handsome and architecturally ornate museum building of any provincial town in the United Kingdom if not in the whole world.

were it not for the fact that it has one arrangement which in museum buildings marks an advance of the greatest importance, namely, that for ventilation. It is like that described above in the technical school and the Rylands Library in Manchester, and which I also observed in

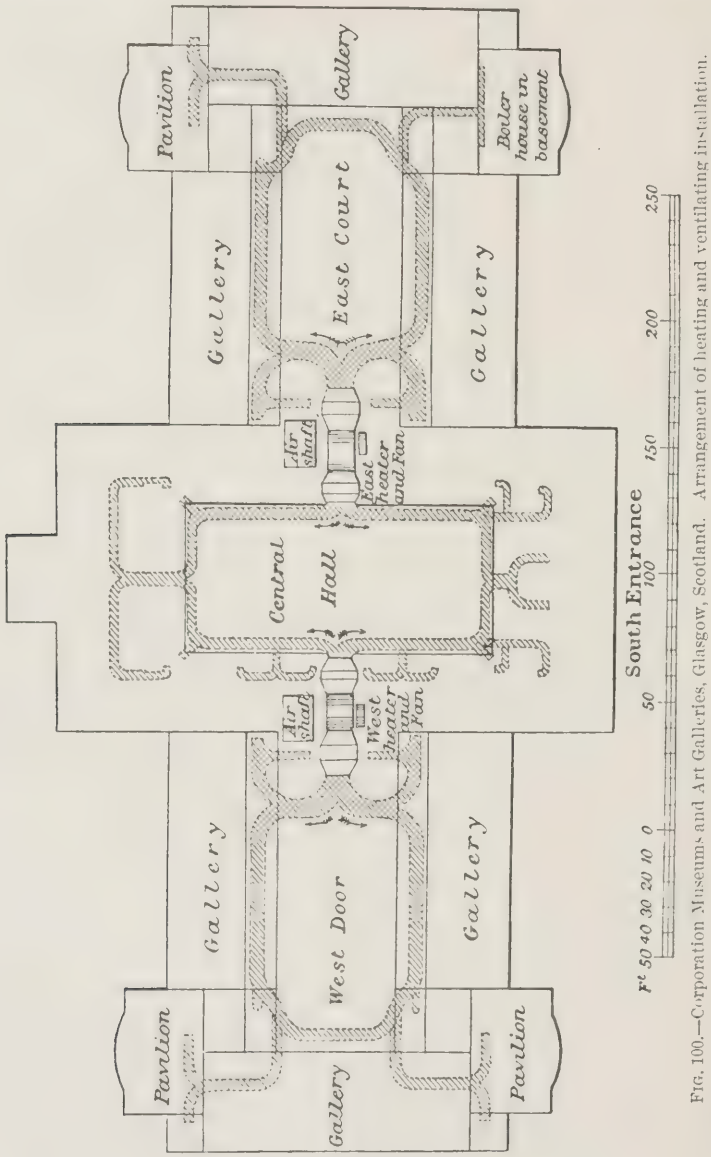

FIG. 100.—Corporation Museums and Art Galleries, Glasgow, Scotland. Arrangement of heating and ventilating installation.

American libraries. Here in Glasgow, however, the scheme has first been applied within my knowledge for museum purposes, at the same time as we shall see with that of the museum in Liverpool. I mark, with the erection of this building, a new epoch in the history of

museum construction, for it is of the most vital importance that in the future none shall be built in which provision is not made for the introduction of entirely clean air. The atmosphere outside, laden with dust and other injurious substances, depreciates every collection in every possible way, and now that we have found a means to obviate this, this means should be employed. The installation of ventilating systems in Glasgow is on a large scale and I had an opportunity to witness its satisfactory operation. It is a serious question in this connection whether it is necessary to keep the windows completely secured, so that they can not be opened, as they are here, or whether such an arrangement should be adopted as in the technical school in Manchester, which permits of their being opened, under the condition, however, that the pressure of the air on the inside is always greater than that from without. This is an indispensable prerequisite. This question is important since the cleaning of securely closed windows from the outside presents great difficulties. In the Congressional Library in Washington very light, exterior iron galleries are employed, from which the windows may be cleaned. Another, though more expensive, arrangement would consist in letting the windows revolve about a vertical central axis and screw the frames on so that they are with not too great difficulty accessible for cleaning from the inside. I believe this latter method is the better, for I fear that it would be hard to maintain at all times a higher pressure of air inside than outside.

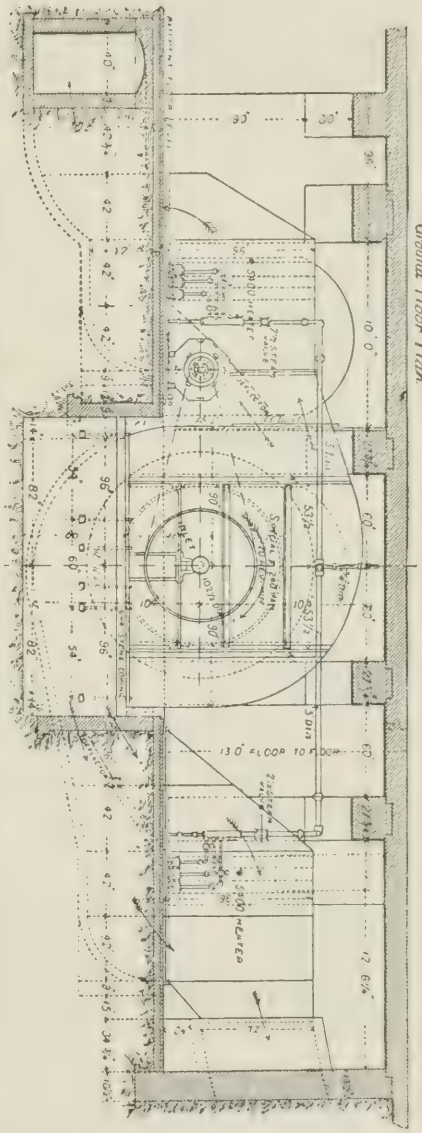

Fig. 101.—Corporation Museums and Art Galleries, Glasgow, Scotland. Arrangement of heating and ventilating installation.

In the art school of Glasgow this method of ventilation has also

been installed with securely closed windows. It will, however, be discarded, since in modeling so much dust is stirred up inside that it is thought that the dust from without could not be objectionable. I should not think it proper, however, to discard the system merely for this reason.

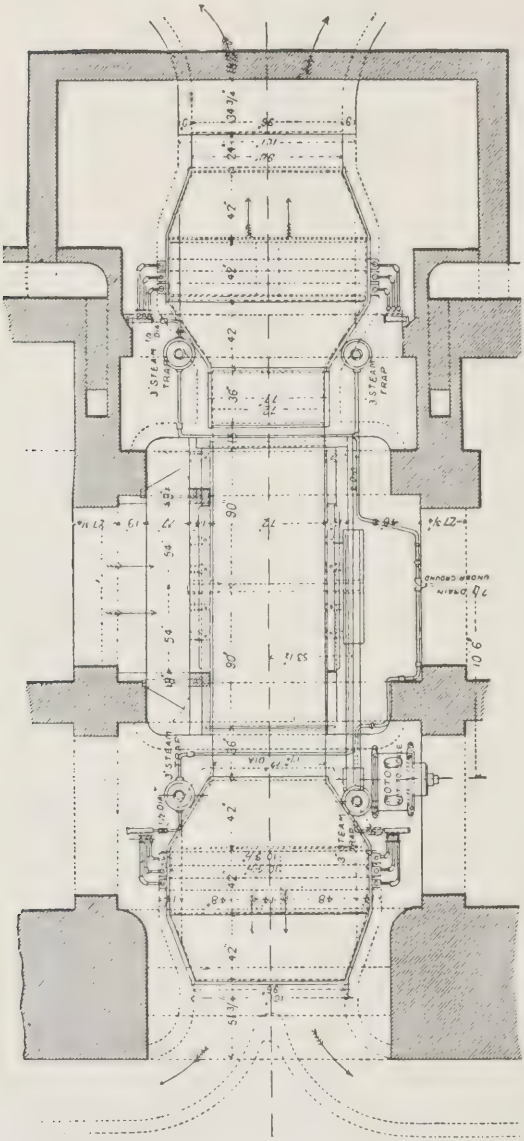

FIG. 102.—Corporation Museums and Art Galleries, Glasgow, Scotland. Arrangement of heating and ventilating installation.

The installation of the ventilating apparatus is shown in figs. 100–102. It cost $40,000, without taking into account the masons' work on the boilers and stacks, and was set up by the Sturtevant Engineering Company (Limited) from designs by Engineer Thomas Young, of Glasgow, based on the plenum system. A detailed description of the diagrams shown in the illustration may be found in *The Engineer* of September 20, 1901, p. 312. The outer air is drawn in at the top of a large tower, 10 by 6½ feet in cross section, filtered, washed, warmed, and then forced into the rooms by means of electric fans. These fans make 120 revolutions a minute and convey 5,000,000 cubic feet of air an hour into the building. The air that has been used is drawn out through conduits near the floor, which lead out above the roof. The entire arrangement has proved most satisfactory up to the present time.[a]

[a] I inquired recently as to the efficiency of the heating and ventilation after two years' experience, and Mr. Cornish favored me with the following reply, dated

33. TECHNICAL COLLEGE; MITCHELL LIBRARY.

The great city of Glasgow, which enjoys the best government of any of the cities of the Island Kingdom, would certainly, on closer study, have offered many other things worthy of examination in relation to museum matters, but my time was too limited.

I shall mention, in addition, the Glasgow and West of Scotland Technical College, founded in 1886, with an annual expenditure of $100,000, 600 day and 4,000 evening pupils, 67 instructors, and a library of 15,000 volumes; also the Mitchell Library, established in 1877, with an endowment of $350,000 by Stephen Mitchell, an annual expenditure of $16,500, and 145,000 volumes. There are probably 500,000 volumes annually consulted, for the library allows no books to be carried away. The daily attendance is approximately 2,000. To prevent a conflagration from flying sparks tubes are laid upon the roof with small apertures through which, upon the opening of a cock in the cellar, sufficient water flows to extinguish any fire. This is an arrangement very worthy of imitation. (See, concerning this excellent library, J. J. Ogle, The Free Library, 1897, pp. 288–293; and F. J. Burgoyne, Library Construction, 1897, pp. 162–166.)

XI.—LIVERPOOL.

Liverpool is a seaport and manufacturing town of nearly 700,000 inhabitants; somewhat hilly, and not as highly smoked up as Manchester, but also black. For this reason the good effect of the very impressive principal square is injured. It is similar to the forum of a Roman city, with St. George's Hall, a building like a Greco-Roman temple, 650 feet long and 200 feet wide, for public assemblages, concerts, etc., built in 1838–1854, at a cost of $1,500,000; a row of monuments, and a long, extending group of museum buildings in the Greek style. Outside of these Liverpool possesses very little of value for my purposes. It has a university college, which is a portion of Victoria University, as mentioned previously (see paragraph on Owens College, in Manchester), with from 500 to 600 students and over 100 instructors. There is also an observatory.

Glasgow, November 24, 1903: I am glad to say the heating and ventilation is giving very good results and I do not think one can at present get a better or cheaper system to do the work required. One alteration I have made is that in place of washing the air at the screens I have put up scrim screens and filter the air through the cloth and so do away with the water, which was causing dampness in the buildings and doing harm to the old paintings and other objects. When one considers that our large buildings can be kept at about 60° in the winter months by a daily supply of 7 tons of washed pearls 'screened dross,' costing at present 7s. 1d. per ton, you will see that the system used is cheap as well as efficient. I may say the floor space of our building is as follows: Picture galleries, 21,450 square feet; museum galleries, 21,336 square feet; central hall, courts, and corridors, which are marble, 45,000 square feet; grand total of floor space, 87,786 square feet.

34. LIBRARY, MUSEUM, AND ART COMMITTEE.

The collection of buildings of the museums of art and science are maintained by the city at an expense of $200,000 and are administered under the "Library, museum, and art committee." They comprise the following departments: (1) An art museum (Walker Fine Art Gallery), built in 1877, on the ground floor of which are plastic reproductions, on the second floor paintings, excellently lighted and pleasantly set off by tapestries and plants, so that a sojourn there is highly agreeable. (2) A library (Picton Reading Room) of 122,000 volumes exclusive of pamphlets, a reference library, principally contained in a great round building. (3) The main structure, called the "Free Public Library and Museums," a library of 95,000 volumes, with five branches in the city, for lending books, with reading and periodical rooms into which people pour from the streets,[a] and a museum of natural science, archeology, ethnography, industrial arts, and art (independent of those branches of art which the Walker Fine Art Gallery cultivates), known as the "Free Public Museums." In the lower stories of this museum building is located the new technical school.

35. FREE PUBLIC MUSEUMS.

The Free Public Museums are open on five week days from 10 a. m. to 4 or 6 p. m., and in the winter, on Monday evenings, from 7 to 10 p. m. In 1899, on 262 days, there were over 300,000 visitors; in 1898, on 264 days, over 350,000. At 12 public lectures on Monday even-

[a] I did not carefully inspect these libraries, founded in 1852, since their arrangements are not modern. Their sphere of action, however, is great. The totals for 1900 are as follows: 666,207 books and 728,128 periodicals were read in the library; 612,386 persons visited the newspaper rooms, and 58,929 the 116 public lectures; 819,317 books were carried home by 22,244 persons ("for the most part they belong to the working classes, and to persons of education but of very limited means"), of which, however, 643,842 were fiction and 132,535 were children's books. Although I particularly mention the fiction included in this total, I do not wish to depreciate the value of such books, for after the day's work there are few recreations so refreshing, delightful, and even instructive to the thoughtful reader as is fiction, while we should not overlook the fact also that the public libraries do not purchase any bad novels. In the Picton Reading Room alone, where no fiction is given out, 246,533 books were read, of which there were, for example, 41,863 technical, 49,748 collected writings, essays, etc., and 22,145 historical and biographical. The library possesses 15,913 technical, 29,042 collected writings, essays, etc., 14,595 historical and biographical works. (Forty-eighth Annual Report Public Libraries, etc., Liverpool, 1901, pp. 5–31; see also J. J. Ogle, The Free Library, 1897, pp. 165–173, and F. J. Burgoyne, Library Construction, 1897, pp. 167–170.) It is open on week days from 10 a. m. to 10 p. m. (Fridays from 10 a. m. to 2. p. m.). The annual expenditures are $100,000, half of which is expended for books, periodicals, and newspapers. About 80 persons are employed. The reference department has a catalogue in three volumes in quarto, 2,066 pages. In Germany we are very backward in this respect, though we far excel the English in the busy life at our hedge taverns.

ings, from January to March in 1900, there were 760 auditors, in 1899 at 21 lectures, 2,470. The museum consists of two great collections: The Derby Museum of Zoology, Botany, Geology, Mineralogy (also an aquarium), which has as its nucleus the mammal and bird collection of the thirteenth Earl of Derby, who presented it to the city in 1851; and the Mayer Museum, covering the other departments mentioned. Joseph Mayer was a rich goldsmith of Liverpool, who in 1867 presented to the city his most valuable collection, consisting especially of pottery, Assyrian, Babylonian, Egyptian, Greek, and mediæval antiquities and manuscripts. I mention as most noteworthy the carved ivories, the collection of Anglo-Saxon antiquities, the Mexican Codex,[a] the miniatures, and the great Wedgwood and old

FIG. 103.—City Technical School and Free Public Museums, Liverpool, England.

Liverpool ceramic collection. In 1860 Sir William Brown presented the present building to the city. At the end of 1897, the space having become too limited, a great wing was added (fig. 103), containing two floors (figs. 106 and 107), each with a single connecting room 36 feet wide, undivided, horseshoe-shaped, 460 feet long, surrounding a courtyard. The lower floor, 20 feet high, is lighted on both sides; the upper, 30 feet high, with a skylight. As fig. 103 shows, the land falls away somewhat. What I have indicated as the lower floor of

[a] This Codex has only recently been published: E. Seler Codex Fejérváry-Mayer. Eine altmexikanische Bilderhandschrift der Free Public Museums in Liverpool, Berlin, 1901; 4to, 230 pp., 22 pls., 219 text figures; and: Duc de Loubat, Codex Fejérváry-Mayer. Manuscrit mexicain précolombien des Free Public Museums de Liverpool. Paris, 1901, 8vo, 28 pp., 2 pls.

the Natural History Museum is the third of the building, since the three below that (the basement, ground floor, and second floor) belong to the new Technical School, which is entirely separated from it and has its own entrance. The lower floor of the Natural History Museum (the third in the new wing) is, however, on a level with the ground floor of the old museum, with which it makes a complete whole (fig. 103). The height of the new wing is 100 feet above the street level. It is hard stone, constructed by E. W. Mountford, in the "modern classic style of the nineteenth century;" it is 206 feet long and 177 feet wide, and has an area of 3,000 square yards. Between the seven windows of the lower museum story on the rounded portion are pairs of Ionic columns 33 feet high. Also, high up above the upper story of the museum are additional rooms for the Technical School, namely, a chemical laboratory and an observatory. The school has 1,300 students. The entire new building cost $675,000, of which $375,000 falls upon the museum. The new large rooms are completed (figs. 106 and 107), and, being excellently lighted and spacious, the museum will, next to that of London, be the most comprehensive, and in all respects one of the best in Great Britain.[a] The lighting of the gallery on both sides, 36 feet wide, is faultless, and the only method suitable for a natural-history museum, since in that way wall cases placed opposite the light are avoided. The upper story could not be lighted in this manner, but it was necessary to depend upon a skylight, as the new wing had to correspond constructively with the exterior of the old museum. Here, likewise, the adaptability of the interior has been subordinated to exterior beauty. The skylight is not by any means bad, though side light would have been better. Besides, the handling of a large skylight is somewhat inconvenient, and it can

[a] In the Report of the Director of Museums relative to the Rearrangements of, and the Cases for, the Collections in the Free Public Museums (Liverpool, 1901, 8 vo., 16 pp.), Prof. H. O. Forbes developes the fundamental features of his plan of installation. The future collections will consist of: I. The Aquarium; II. The Mayer Museum, that is subdivided into three great ethnographical divisions, in the Caucasian (white), the Mongolian (yellow), and the Melanic (black) races; III. The Lord Derby Museum, the latter being subdivided as follows: Types of the Principal Groups and Subdivisions of the Animal Kingdom, from mankind down to unicellular forms. This biological collection begins with an introductory series of animals, plants, models, and drawings, illustrating the distinction between inorganic and organic objects, between plants and animals, as well as the general formation and the physiology of animals. Associated with the living forms will be the fossil ones, so that by studying them together the development from the first to the last may be observed. Then will follow the mineralogical and the geological collections. Beyond this a representation of the geographic distribution of animals and plants, as well as of protective mimicry, variation of species, and other fundamental principles of biology. Finally, a collection of objects by countries not confined to too narrow geographical boundaries, but including the adjacent waters, will aim to be practically complete. Botany will be put in advance of everything else in a British collection, but typical examples of all natural orders will also be given.

never be kept clean. The electric illumination employed at night consists of arc lights reflected from the ceilings, of which a test was being made at the very time of my visit. It resulted successfully, even in the skylight floor. The iron cases for the collection will soon be completed. There is allotted for the interior furnishing $125,000 (the interior arrangements of the Technical School cost $75,000).

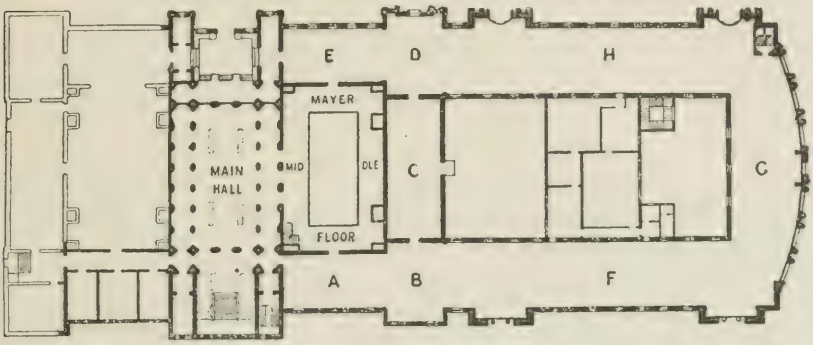

FIG. 104.—Free Public Museums, Liverpool, England. Plan of lower floor.

The present portion of the old Museum must be less favorably spoken of. The rooms are too dark; one with a skylight and galleries suffers much from reflections on the broad desk cases arranged along the rail. The vertical and horizontal cases are some of them very clumsy. I observed, however, a good arrangement upon horizontal cases, namely, a brass mounting on the anterior framework, on which the observer can lean while examining the objects in the case. The

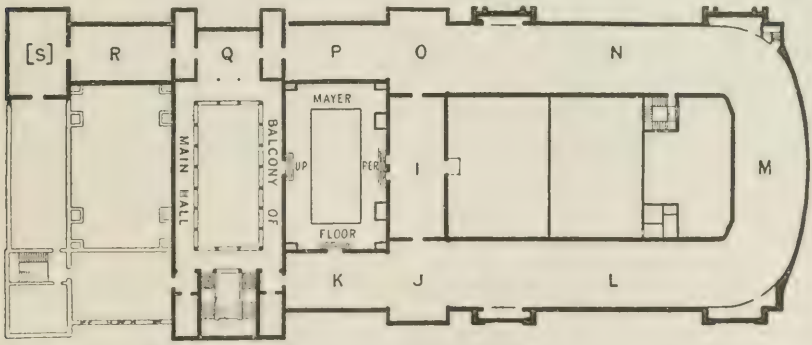

FIG. 105.—Free Public Museums, Liverpool, England. Plan of upper floor.

collection, owing to the rebuilding, is not well cared for at present; it is also overcrowded, but contains much valuable material. The new installation of the entire Museum will work great changes in this respect. This Museum suffers, like others, from a lack of a sufficient corps of assistants. The newly installed anthropological hall is exceptionally fine in its clear arrangement and the choice of its

objects. It contains, for example, life-size photographs of the heads of different races, enlarged from smaller negatives. The ethnographic collection, now temporarily installed in the basement is very considerable, containing many old specimens and also a good representation of Benin bronzes. The noted ornithological collection is rich in types, and contains among other things the famous collection of the ornithologist, H. B. Tristram.

The principal reason why I dwell longer on this Museum, though its importance is of the future rather than of the present, is because in one respect, together with that of Glasgow, it excels all other museums of the earth, and that is as regards the new ventilating and heating

FIG. 106.—Free Public Museums, Liverpool. One of the longitudinal galleries of the upper floor in new building ("L" in fig. 105).

installation. When the large new wing for the technical school and the museum was designed, not only that, but also the old museum, the library, and the art gallery, were supplied with the ventilating and heating contrivance described in connection with the Glasgow Museum. Engineer W. Key, of Glasgow, superintended the installation of this in Liverpool. There are four and a third miles of 3-inch tubes, which carry purified and warmed air into each room at the rate of 8,000,000 cubic feet an hour. The ducts through which the purified, washed, and warmed air streams into the tubes, are so large that one can easily walk in them. The power is supplied by great dynamo machines. The future must demonstrate whether, being located in

the same building, these will not damage it by causing vibration. This has very generally been avoided in America. I am not favorably disposed to the combining of a technical school and its many laboratories in the same building with a museum. The windows of the building can not be opened, and the collection has the rare advantage in that no dust is brought in with the air to damage them; neither does any come in through the doors, since the pressure of air on the interior is somewhat greater than that from without. This system of ventilation is known as Key's improved plenum method. It was a surprise to me that the authorities in the Liverpool, as well as in the Glasgow Museum, did not know that this same installation existed in the other

FIG. 107.—Free Public Museums, Liverpool. One of the longitudinal galleries of the lower floor in new building ("F" in fig. 104).

museum. I repeat that the two museums of Great Britain which I have mentioned excel in this respect all museums of the world, and I earnestly recommend that we adopt this arrangement and do not remain in the background. The Liverpool Museum appears to have reached this in connection with the construction of the technical school, while that of the museum in Glasgow was carried out independently.

I notice in a printed letter of the firm of William Key (works for ventilating and warming by mechanical means, Havelock street, Glasgow) that such installations have already been introduced into a great number of schools, hospitals, factories, hotels, private dwellings,

municipal buildings, etc., in England and Scotland, and that it is also installed in the university and the public library in Aberdeen. The Key list enumerates more than 80 buildings. Great Britain has probably outrivaled America in this respect, at least I found this installation only in two large buildings in Chicago (see the second part of my American studies) and in one in Washington. In the pamphlet published in connection with the opening of the New Central Municipal School in Liverpool on October 26, 1901,[a] the ventilating and heating arrangements are referred to as follows:

The air in the building is kept under a pressure slightly greater than that of the outside atmosphere. The air is taken in from the large area at the back of the building, and after being washed and filtered by passing through wet fiber screens, and warmed when necessary by means of a large surface of coils of pipes heated by steam, it is propelled by four large fans into the main ducts in the subbasement and then by subsidiary ducts to each room in the building. The air is admitted to the rooms at a height of about 6 feet from the floor, and escapes at the floor level into the foul air ducts which lead to the outside through apertures protected by valves. (The electric power is supplied by the city works).[b]

From 1877 to 1891, the museum published, at irregular intervals, five Museum Reports relating to scientific subjects; since 1898 a Bulletin of the Liverpool Museums, in octavo, with plates,—a well-edited publication, of which three volumes have appeared; in addition, Annual Reports, of which the forty-eighth, for 1900, has been published (37 pp.); guide books, such as Synopsis of an arrangement of invertebrate animals in the Free Public Museum of Liverpool, 1880 (32 and 105 pp.); catalogues, such as Catalogue of the Mayer collection: Part I, The Egyptian, Babylonian, and Assyrian Antiquities, 1879, ix, 83 pp., with illustrations; Part II, Prehistoric Antiquities and Ethnology, 1882, xiv, 106 pp., with illustrations; Part III,

[a] Sir William Forwood, chairman of the "Library, Museum and Arts Committee" of the city council, on the occasion of the laying of the corner stone on July 1, 1898, said among other things: "This building is intended for the higher technical education—for educating the captains of labor, and not merely the artisans, in a way that would enable them to meet the competition of Germany. The Germans have had these superior schools for years, and have been turning out a large number of expert and scientific men such as did not exist in England." As in the great Technical School in Manchester, so also in Liverpool, they are striving to compete with Germany in technical matters.

[b] I inquired recently as to the efficiency of the heating and ventilation after two years experience, and Mr. Forbes, the director, favored me with the following reply, dated Liverpool Nov. 28, 1903: "In regard to the heating and ventilating system of the museums I am sorry to report not quite favorably. This, however, is not the fault of the system of Key, which, by the way, has been further perfected, but by reason of the intake aperture for the fresh air having of necessity, and unfortunately, to be placed in a 'well' (surrounded by walls 70 to 80 feet high), with which the air from the galleries is discharged and necessarily so constantly being redriven into the Museum. We are thinking of changing the 'intake' openings—a costly procedure—and when this is done, I believe all we can desire would be attained."

Mediæval and Later Antiquities, including the Mather collection of miniatures and medals relating to the Bonaparte family, 1882, iv, 108 pp., with illustrations (sixpence for each part). I call attention also to the valuable writings of a former director of the museum, H. H. Higgins, Museums of Natural History: (1) Museum Visitors, (2) Museum Desiderata, (3) Museum Arrangements, (4) Museum Appliances, (5) The British Museum of Natural History (1884, 43 pp., with illustrations, sixpence), and to I. A. Picton's paper, Primeval Man, a lecture illustrative of the prehistoric remains in the ethnographical collection of the Liverpool Museum, 1881 (27 pp., with 5 plates, twopence). Collecting expeditions are organized by the museum, such as one in 1898, which went to Socotra.

The annual expenditure is $52,000. The officers are: Director, H. O. Forbes; curators of the Derby Museum, J. A. Clubb and W. S. Laverock; and curator of the Mayer Museum, P. Entwistle.

XII.—DUBLIN.

Dublin is a seaport with about 250,000 inhabitants, without factories, and consequently reasonably clean, though not free from soot.

36. SCIENCE AND ART MUSEUM.

The Science and Art Museum comprises, with the National Library (fig. 108), a large, imposing, and beautiful group of buildings, inclosing on three sides a courtyard, which is fenced by a grill in front. The central building, the Leinster House (the former castle of the Duke of Leinster), is occupied by the Royal Dublin Society. Here are also located the administrative offices of the museum. On one side of this is situated the museum and on the other the library (fig. 108), both erected nearly alike by T. N. Deane & Sons and opened in 1890. The natural history department has a wing to itself (fig. 109). In the rear is an extensive park, in which, near the library, stands the National Gallery.

The Science and Art Museum is open weekdays, admission free, from 11 a. m. till 5 p. m. and closed only on Good Friday and Christmas Eve. On Tuesdays the department of art and industry, and on Thursdays the natural science department, are open until 10 o'clock in the evening. The former is open on Sundays from 2 to 5 p. m. The number of visitors in 1900 was 425,884, of which 64,165 came on Sunday afternoons.

This museum, like the one of the same name in Edinburgh, is copied more or less after the South Kensington Museum, with the addition of a natural science collection. This uniformity of the museums in the Island Kingdom corresponds to the uniformity of life there, which in Germany and France is much more varied. It is often said that

individual freedom of development is greater in the English than in the German, but this appears to me to be very questionable.

The interior of the museum building does not altogether harmonize with the beautiful and impressive exterior. There is a central, large lighted court with two galleries, one above the other in the style of a railway station, overdecorated, checkered, and somewhat wanting in good taste, even in the eyes of the officials themselves (it is called there the "German" taste; that is, like the cheap, inferior wares that were formerly imported); adjoining is a great series of rooms, of which some are very dark, especially the one containing the ethnographic collection. The poor lighting could be much improved by the Luxfer prism glass, but this scheme has been adopted as yet to very limited extent by the museums of the Island Kingdom.

The zoological collection, too, has a large hall, lighted from above, with two galleries superposed (fig. 110), but the lighting facilities are somewhat meager, the cases and desks primitive, and the installation

FIG. 108.—National Library of Ireland, Dublin, Ireland.

not very elegant. I mention especially a Shakespeare case, with birds trained for hunting, falcons, and the like, together with passages from the works of the poet. Very noteworthy is the representation of the geographical distribution of animals in seven sections; distribution in general and six geographical regions. I know only one museum in the world where the same thing is attempted, namely, the Museum of Comparative Zoology in Cambridge, Massachusetts, which I hope to describe in a future report. In Dublin this exhibition is not developed very extensively, but it is highly commendable. The great museums of the world (London, Paris, Berlin, New York, etc.) have nothing similar to this, yet they only are in a position fully to carry out such a scheme. The systematic exhibit must necessarily be supplemented by a geographic one. It is a matter of satisfaction that at least one European museum, too, has undertaken this important task, even though on a small scale.[a] Very noteworthy also, and as I believe unique, is the

[a] It has lately also been tried in the Dresden Museum.

exhibition in the "History of Animals Collection." It represents the history or the origin of species, classification, variation, natural selection, instinct, development, etc.

A conspicuous feature of the large collections is the one representing Irish archeology, with rich and rare series, among them a large number of gold ornaments. The cases here are to some extent better, but they are closed by padlocks suspended on chains, the appearance of which is not very pleasing. The gold treasure is inclosed in a steel fire and burglar proof case, which is especially guarded. In this museum, too, the policeman plays a great rôle. A valuable antique gold ornament, discovered in Ireland in 1896, was purchased by the British Museum, but is claimed by Ireland.[a]

Since the art and art-industrial collections of the museum cover all branches, as in the South Kensington Museum, I can not consider them

FIG. 109.—Science and Art Museums, Dublin, Ireland. Natural History building.

properly in a brief space. They are very notable (for example, the historical portion), but their exhibition offers few individual features.

The ethnographic department, though it has many gaps, is rich in old South Sea objects, though it is not yet thoroughly arranged. I was much impressed with the good labeling in some of the cases. The large type used in printing the labels is conspicuously better than the small letters almost everywhere in use. They can be read without effort—not so with the "South Kensington labels," which are distributed over the entire country. This use of large type is well worthy of imitation. Another arrangement which appealed to me as worthy of adoption is that in many of the cases there is hung a printed bibliography covering a

[a] See *Museums Journal*, I, 1901-2, pp. 175, 238; compare also *Proceedings of the Society of Antiquities*, Scotland, 3d ser., X, 1900, pp. 4-7. It has been transmitted, in 1903, from the British Museum to the Dublin Museum, after a lawsuit which was won by Ireland. See *Nature*, Nov. 27, 1902, p. 89, and *Museums Journal*, III, 1903, p. 23.

special subject. The valuable bulk of the ethnographic collection indeed is loaned by Trinity College (University), whose ownership, however, is only a matter of form (Catalogue, 1895, see p. 581). In this part of the collection are very rare pieces obtained by the Cook

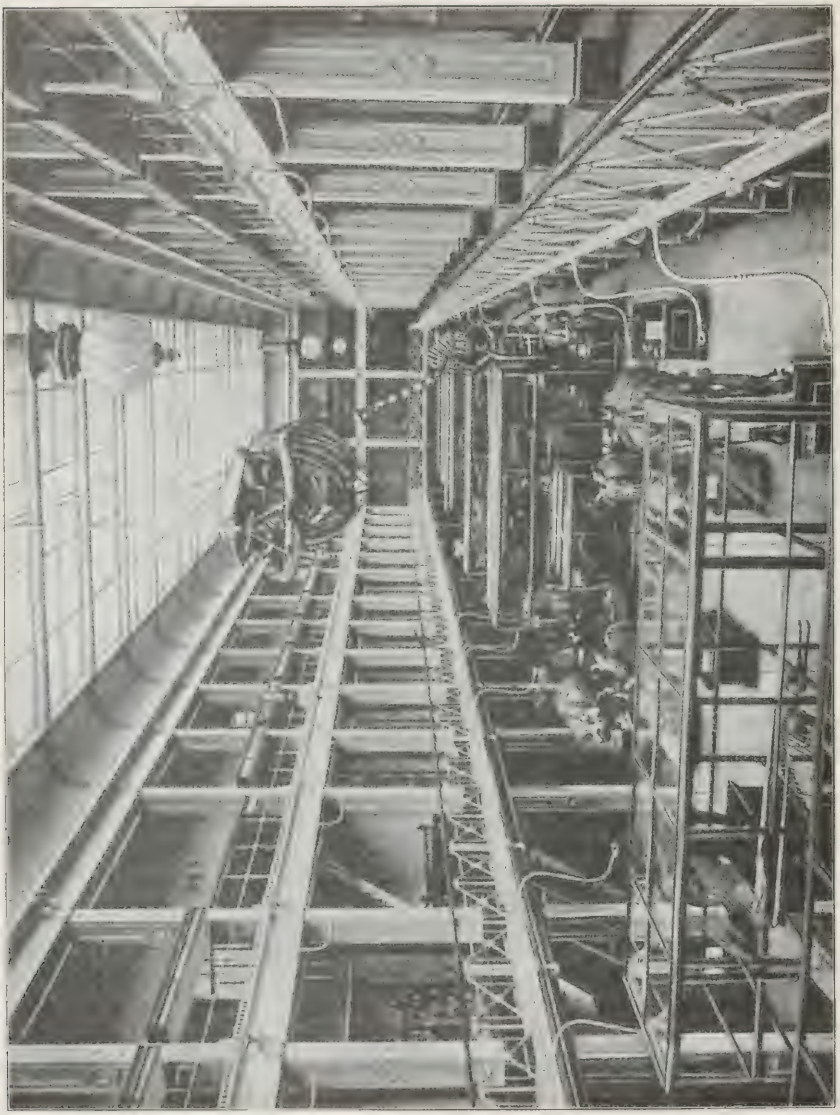

FIG. 110.—Science and Art Museums, Dublin, Ireland. Hall of the Zoological Department.

Oceanic explorations, besides others from New Zealand, Hervey, Fiji, etc. A description of these treasures, with illustrations, would be appreciated, since Dublin is not so easy of access. Each region is divided into eight groups fire, war and the chase, music, clothing, house utensils, agriculture, religion, miscellaneous.

In order to convey an intelligent idea of the rich contents of the great collections I give, in conclusion, the principal divisions from the Short Guide to the Collections, in the order in which they are there set forth:

Art and industrial division, including antiquities and ethnographical collections.—Greek sculpture; architectural ornaments; works of times after the Renaissance; Italian; French; casts of statuary; Greek and Roman antiquities; Egyptian antiquities; ethnographical collections; oriental collections, chiefly Indian; Italian architectural ornaments; musical instruments; furniture; Assyrian and other oriental antiquities; enamels; brass and bronze; iron; English silver; Irish silver; foreign silver; Leinster collection of postage stamps; Irish antiquities (bronze tools, gold, early Christian art in Ireland); arms and armor; carved ivories; copies of works in ivory, bronze, marble; Japanese art; architectural design; water colors and sketches; miniatures; engraving and etching; pottery and porcelain; China, Burmah, Ceylon; lace; machinery and manufactures.

Botanical department.—Index room; economic collection; herbarium.

Natural history division. History of animals collection; geographical distribution collection (general distribution, Australian region, Ethiopian region, Oriental region, Palearctic region, Nearctic region, Neotropical region; Irish animals; injurious insects; general collection; fossil animals.

Geological and mineralogical departments. Mineralogical and petrological collections; geological collections; collection of Irish minerals; collections of geological survey of Ireland.

I have before me the following publications (Department of Agriculture and Technical Instruction for Ireland; Institutions of Science and Art, Dublin):

Report of the director for the fifteen months ending 31st March, 1901, with appendixes. 8vo, 1901, 39 pp.

Short Guide to the Collections. 19th ed., s. a. 4to, 10 pp. (half penny.)

Guide to the Natural History Department. Series I: Vertebrate Animals (recent). Part I—Mammals and Birds, by A. G. More. 8vo, 1887, 38 pp. (4½ pence.) Series II: Invertebrate Animals. Part I—Recent Invertebrates, by A. C. Haddon. 8vo, 1887, 17 pp. (3 pence.)

A list of Irish Birds, by A. G. More, 2d ed. 1890, 38 pp. (4 pence.)

Guide to the Collections of Rocks and Fossils, by A. McHenry and W. W. Watts. 8vo, 1898, 155 pp. (9 pence.)

General Guide to the Art Collections: Part I: Greek and Roman Antiquities. Chapter III—Greek and Roman Coins. 8vo, 1899, 107 pp. (1 penny.) Part IV: Lace and Embroidery. Chapter I—Lace. 8vo, 1899, 23 pp. (1 penny.) Part VIII: Furniture. Chapter I—Italian Furniture. 8vo, 1899, 11 pp. (1 penny.) Chapter II—French Furniture; also Dutch, Flemish, German, Spanish, and Portuguese. 8vo, 1900, 22 pp. (1 penny.) Chapter III—English Furniture. 8vo, 1900, 22 pp. (1 penny.) All three by G. T. Plunkett. Part XV: Ivories. 8vo, 1899, 49 pp. (1 penny.)

Collection of Weapons, etc., chiefly from the South Sea Islands. 8vo, 1895, 16, 62 pp.

Two Lectures on the Art of Lace Making, by A. S. Cole. 8vo, 1884, 20 pp. (2½ pence.)

List of some books in the National Library of Ireland or in the Library of the Museum which may be useful to visitors to the Museum. Natural History Collections: Zoology, Geology, and Mineralogy. 8vo, 1900, 16 pp. (1 penny.)

In the winter of 1900–1901, 22 free lectures were delivered by 14 different gentlemen, admission by card, which were attended by 755 persons, a comparatively small number.

The director of the entire museum is G. T. Plunkett, who is also director of the Royal College of Science, the Metropolitan School of Art, the National Library and the Botanical Gardens. Other officers: Curator of the department of art and industry, Thomas H. Longfield; assistants, J. J. Buckley, E. P. Alabaster and A. McGoogan; curator of the department of Irish antiquities, G. Coffey; curator of the natural science department, R. F. Scharff (a German); assistants, A. R. Nichols, G. H. Carpenter, R. Pride; of the botanical department, T. Johnson; of the department of geological survey, R. Clark; of the mineralogical department, G. A. J. Cole.

The annual expenditure in 1897–98 was $120,000. The administration appears to be cumbersome; since, for example, in the ethnographic department, authority must be obtained from London (from the science and art department), for a purchase, even though it involves but a few pounds. Whether this condition exists in the other departments, I do not know.

37. NATIONAL LIBRARY OF IRELAND.

The National Library of Ireland is magnificent without, but within is not up to strict modern library requirements, though the building was completed only in 1890. The architect, as is so often the case, sacrificed interior adaptability to exterior appearance. The stack system (five decks) is made with floor plates of hammered glass and iron, but with wooden racks. In many places the stacks are so poorly lighted that electricity must be used even in daytime. The horseshoe-shaped domed reading room (68 by 65 feet and 52 feet high,) occupies much space in the middle of the second story. There are three smaller reading rooms. On either side of the rotunda are the book stacks, but only those in the right wing are as yet in use. Each is 110 feet long, 36 feet wide, and 54 feet high, with a capacity of about 200,000 books. The middle one of the five decks of the book stacks is on a level with the great reading room. In each of these there are 26 double racks, approximately 8 feet high, with an intervening space of 40 inches, each with 8 or 9 shelves. On the ground or first floor, in the center, are located, in addition to the broad entrance hall and

the great stairway, the administrative offices. Whatever shortcomings this building may have, it has at all events been carefully thought out and not erected after the general pattern. It is surpassed, however, by the new American libraries. I received the impression that they strive to be successful, but the means at their command are too limited. Annual reports and catalogues of the annual accessions are published. The library increases rapidly through donations. It contains at present 150,000 volumes. It must be emphasized that the arrangement is after the Dewey system, this being, perhaps, the only large library in Europe which employs it. It works excellently, though the books, on account of the small force of assistants, have no outside markings. The Dewey classes are distinctly indicated by labels on the stacks and easily found. Within the classes an alphabetical arrangement is followed, and when there are more books than one can conveniently review at a glance a sequence of the letters is attached to the stacks. The general opposition on the part of librarians to the Dewey system is perhaps based principally on the immense amount of labor involved in the reassignment and rearrangement of a library, which can not be undertaken without very considerable means, and then, again, other systems have also their good points.

It is open from 10 a. m. to 10 p. m. During 1900 there were 148,405 readers.

(See also F. J. Burgoyne, Library Construction, 1897, pp. 153–158, with ground plans and cross sections, and J. J. Ogle, The Free Library, 1897, pp. 191–192.)

38. NATIONAL GALLERY.

The National Gallery has just received the addition of a large new wing, with skylights, and side lights in alcoves; in these the walls are not at right but at obtuse angles, which is certainly preferable. The large building makes, by its simplicity, a very favorable impression. The old portion was constructed during 1859–1864, and cost $150,000. In 1898 there were on exhibition 464 paintings, 348 drawings, water colors, etc., 280 portraits, 16 busts, and a collection of casts. It is open on four week days from 12 to 6 p. m. (or until darkness sets in); on Sundays from 2 to 5 p. m. (or until dark), admission free; on two week days it is open from 10 a. m. to 4 p. m., admission sixpence. (See Catalogue of the pictures and other works of art in the National Gallery and the National Portrait Gallery, Ireland. Dublin, 8vo, 1898, 361 pp.)

39. ANATOMICAL INSTITUTE OF THE UNIVERSITY.

I also visited the anatomical collection, on account of its anthropological department, but as the hall was just being rebuilt and the cases shoved together, I could see but little. The collection of

skulls appears to be not unimportant. The director is D. J. Cunningham, professor of anatomy, also well known as an anthropologist.[a] The Anatomical Institute is excellently installed, the large dissecting hall being light, airy, and furnished with the most beautiful dissections, which here are preferred even to the best colored pictures.

UNIVERSITY (TRINITY COLLEGE.)

The university (Trinity College) consists of an extended group of buildings beautifully situated in a large park which is quite within the city. I could not examine it, however, because it would have consumed more time than I had at my disposal.

XIII.—PARIS.

My remarks may well be somewhat brief, considering the abundance of matter and the fact that Paris is universally known. I confine myself to a few notes on my observations.

40. MUSEUM OF NATURAL HISTORY IN THE BOTANICAL GARDEN.

[Muséum d'Histoire Naturelle au Jardin des Plantes.]

The majority of the museum halls in the Jardin des Plantes are of the old-fashioned style, which have been already criticised by J. Marcou in his book, well worth reading, De la Science en France, 1869. But in 1889 a large, new, zoological museum was completed, which, as I then saw it, was nearly filled and is now already overcrowded. Furthermore, there was built three years ago a paleontological, comparative anatomical, and anthropological museum, as the first of a series of new galleries which are to be located adjoining each other on the Rue de Buffon, the southern boundary of the Garden, their long sides turned toward the Garden and the street.

ZOOLOGICAL COLLECTION (GALERIES DE ZOOLOGIE).

The Galeries de Zoologie is a large rectangular building, 100 meters long, 62 to 70 meters wide, and about 25 meters high (without cupola), with a lighted court 70 meters long, 41 wide, and 20 high, and three galleries superposed. To say it is a failure is not my judgment alone. The exterior is in very good taste. The great glass-covered lighted court was designed by the architect, J. André, as a central space to be ornamented with plants, and was not intended for the collections. It is full of large mammals, mounted on too conspicuous wooden bases—an immense herd, all standing free and some of them impossible to inspect except at a distance. The entire space of the height of three

[a] Mr. Cunningham has since been appointed professor of anatomy in Edinburgh, as successor to Sir William Turner. The director of the Anatomical Institute in Dublin is now Prof. J. Symington, formerly in Belfast.

stories from the floor to the glass roof is empty. It would be well adapted for the large whale skeletons,[a] but they are exhibited in the collection of comparative osteology. Besides, they would detract still more from the only source of light for the broad encircling galleries, for these obtain their light only from above. In consequence of this they, especially the lower ones, are much shaded, being in some places so dark that nothing can be seen. In the front (Garden) portion of the building are halls 53 by 10 meters, provided with light from one side; on the ground floor these are 7 meters high, in the second story 6, in the third story 5, and in the fourth story, with the roof work, 7 meters.

In examining this building one can learn, as in many others, how a museum should not be designed. A few of the special features of the building have been published by F. Monmory.[b] The building cost $800,000, the fixtures $600,000. Photographs were not obtainable.

The collection is installed in not very pleasing wooden cases, without great care. In addition the cases are in some instances overcrowded and filled to the top, where nothing can be discerned. There is still followed here the almost universally abandoned practice of exhibiting very many stuffed animals, reasoning that people who donate things—and much is here donated—wish to see where the objects are placed. This practice will necessarily have to be discontinued at some time, even though republican France is more conservative than elsewhere. The working rooms of the officers and preparators are mostly in a separate old building, far away in the Rue de Buffon, which is very inconvenient.

COMPARATIVE ANATOMICAL, ANTHROPOLOGICAL, AND PALEONTOLOGICAL COLLECTION.

[Galeries d'Anatomie Comparée et d'Anthropologie.]

This collection was opened in 1898.[c] This building also has a tasteful exterior of red brick, with light stone trimmings and artistic decoration. On the side facing the garden there are four bronze and eight marble reliefs, representing human and animal life, by Barrias, Marqueste, Coutant, and Gardet; in front of these, two statues by Frémiet. On the narrow side, where the entrance lies, is a tympanum, by Allar, representing the three kingdoms of nature. The building is about 86 meters long and 15 and 27 meters wide. It is fireproof, of iron, stone, brick, and cement. The protection against fire was considered to such an extent that the workrooms of the staff are located

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[a] See also G. Pouchet: De l'affectation de la grande salle centrale des nouvelles galeries du muséum. *Revue Scientifique*, 3 sér., XLI, 1888, p. 334.

[b] *Revue générale de l'Architecture* (4), XII, 1885, pp. 2492–51, pls. LXIII–LXV.

[c] See *Bulletin des Nouvelles Archives du Museum d'Historie Naturelle* (3), X, 1898, pp. iii–xii.

in an old building in the Rue de Buffon, half a mile away, which is very annoying, since in the present day complete security can be had without this inconvenience. As a further security against fire, electric lighting is not used. The building with its furniture cost $625,000. The architect was F. Dutert. In the white entrance hall with columns there is a marble group by Frémiet, and animals in relief as capitals, the whole simple, in the refined taste characteristic of the French. On the right there is a charming little lecture hall with a ceiling picture by Cormon, The March of the Races of Men toward Light, and ten pictures illustrating prehistoric times. The building consists principally of a ground floor, lighted on both sides, and a second floor, lighted from above, with a gallery. The projecting stairway hall is situated at the eastern narrow side, and is of four stories, with smaller rooms such as the lecture hall already mentioned and some rooms for collections adjoining. It is surmounted by a high, arched roof. The large hall on the ground floor (fig. 111) is not partitioned, is somewhat narrow (14 meters inside) compared with its length of 77 meters, and at the same time its ceiling is somewhat low (6.6 meters)[a] compared with its length, but its effect is excellent and imposing, and is a model as to its lighting. As regards the points of the compass, however, the building is as unfavorably located as possible. The long sides look toward the north and the south and the collections are consequently exposed to the sun during the entire day. For this especial collection it makes naturally very little difference, but the window shades must be drawn on the south side when the sun shines, and this bathes everything in a colored light, an error which we observe in many museums in the world, but which should always be avoided. The windows begin at a height of 2.6 meters from the floor, and are 4 meters high, 3 meters wide, the window piers being 1.8 meters wide. The cases, which are 2.4 meters high, stand against the wall under the windows, and therefore receive their light from the high windows on the opposite side. At the end of the hall on the narrow side is a gallery. In this large hall the osteological collection is installed, the larger animals in the center being uncovered—a magnificent view—the others being inclosed in wall cases. These, made with iron framework but wooden bases, though not answering the

[a] The height of the halls I could not determine on the spot, but Mr. H. Sinding-Larsen, an architect of Christiana, had the goodness later to give me these measurements, together with others, without, however, being able to vouch for their absolute accuracy. In this museum, as in almost all which I visited in Europe and the United States, it is very difficult to obtain information concerning the buildings, since the directors, however willing they may be, do not have the data in their possession, and the administrative and building authorities who have this information can only be approached by foreigners with great inconvenience and with a great loss of time. To obtain special information through correspondence is generally very difficult and often impossible.

strictest claims and not dust proof, are yet good and serviceable, except that they have too much framework and too small doors. The installation has been attended to with the greatest care and everything carried out with a degree of excellence that we seldom find.

FIG. 111.—Museum of Natural History, Paris, France. Collection of comparative anatomy. First floor of the "Galeries d'Anatomie."

In the second floor (fig. 112) the large hall is also not partitioned, and is 10 meters high to the skylight; and to the galleries, 4.6 meters. In the open space under the skylight are the large specimens of the paleontological collection without cover, which likewise produce a splendid effect. Along the walls, in cases 2.4 meters high, under the gallery, are the smaller skeletons and special exhibits of such a collec-

tion whose extent, dating back to the beginning of the Paris Museums (founded in 1626), is very important. There is here also an extremely imposing installation, everything being well worked out and labeled. The light in the wall cases is, however, not always sufficient, since the main source is above, and only at greater intervals are there side win-

FIG. 112.—Museum of Natural History, Paris, France. Collections of paleontology and anthropology. Second floor of the "Galeries d'Anatomie."

dows. It would certainly have been better if the second floor, like the ground floor, had been arranged as a covered room with light from both sides, but the architect here, as so often happens, has subordinated the interior uses of the building to its exterior beauty. Light from above, which is perhaps best for a picture gallery, is not always

well suited for natural history collections. The galleries are, for the most part, imperfect.

The showy wrought-iron railing, about 250 meters long, which incases the stairs to the gallery, and the entire railing of the same, is very obtrusive. It represents large fern leaves and is by itself a piece of art, but in this place it is too massive, too conspicuous, and consequently distracting. In the gallery the anthropological collection is installed (fig. 113) as far as the space allows, comprising the long-famous collection of skulls, casts, pictures, etc., relating to physical anthropology. Besides this a prehistoric collection is in adjoining halls, above the lecture room on the ground floor. This anthropological department is not quite so elegantly exhibited and labeled as the paleontological and osteological collection.

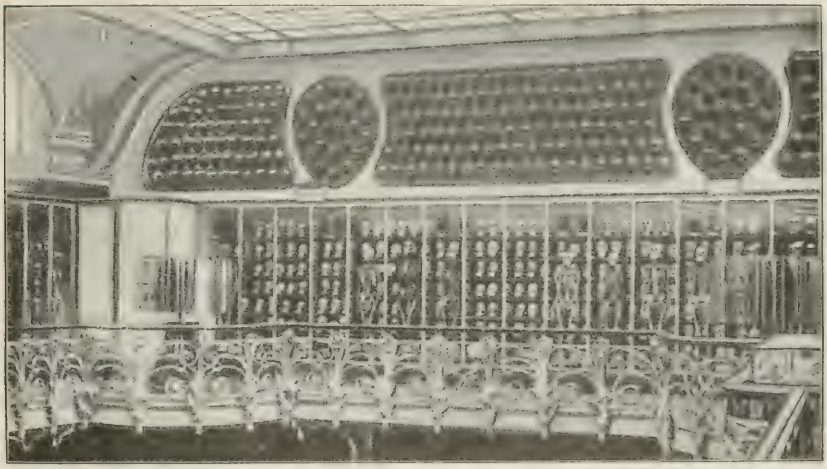


FIG. 113.—Museum of Natural History, Paris, France. Part of the anthropological collection. Gallery of second floor of the "Galeries d'Anatomie."

It is planned to place the "galerie" which is next to be built closely adjoining, so that the present collections can be extended, and room be obtained for those portions which belong to this section, which for lack of space can not now be shown at all, such as the remainder of the anthropological collection, the whale skeletons, etc. They here also built too sparingly from the beginning, but were wise, however, to arrange the new museum so that it can be horizontally enlarged. The style of architecture does not permit of its being extended in a vertical direction.

There is a parquet floor, very stylish to look at, but wearisome to the visitor, since scarcely anyone is accustomed to walking on smooth parquets without carpets being spread over them.

The new "Galeries d'Anatomie" are, without doubt, a prominent production in the line of museum technic. They exhibit a rare taste, and the building closely approaches being a faultless model of its kind.

It is in a most happy way different from the general pattern. Everyone who has a museum to build should study carefully this Parisian one and adopt its good features. This advice can be given with regard to but very few museums.

Photographs of the exterior were unobtainable.

I am indebted to Dr. O. Richter, assistant in the Dresden Ethnographic Museum, for the following separate data recorded by him on his visit in February, 1902:

Ground floor (see fig. 111).—Wooden cabinets, with iron doors without crossbars, set in wooden frames, the latter, however, only above and below, and laterally at the end of long rows of cases joined together. Doors with steel frames all approximate 75 cm. wide. The numbers of the cases are indicated by raised metal figures on the bottom, inside; color, silver. The shelves are of glass, also the bases for the installation of individual objects on the shelves, so that glass rests upon glass. The stands for specimens are of German silver. The rails and brackets are of iron, the latter secured by screws. The labels are of gray paper or pasteboard in red and black round hand; the mountings are placed obliquely or horizontally; they are of dark-blue glass if the objects are light colored. The same applies to alcoholics, in bottles, presenting a dark-blue background. The closing of alcoholic bottles with tin foil is obtrusive. The wood of the cases (and horizontal cases, see below), the bases of the free-standing specimens, the floors and shelves, are uniformly light oak-brown. The rails and backgrounds of the cases, however, are reddish brown.

Second story.—Here the mountings are also of wood covered with reddish-brown cloth; stands of brass, not of German silver. Horizontal cases with wooden drawers below, and narrow metal frames above; no plate-glass pannels, but with crossbars. The construction is as follows (see figs. 111 and 112): The wooden cases are surmounted by horizontal glass cases with gold-bronze metal frames on which are tongues for lifting the covers. The wooden drawers are supplied with massive round, button-like, wooden handles (two to each), set in hollowed recesses. A row of these drawers, situated one above the other, may be locked at the same time, through a general catch, which is located in the upright between the several rows of drawers.

Gallery.—Anthropological collection (see fig. 113). Skulls on black bases with four ball-shaped feet. The arrangement is a geographical one: skulls, skeletons (on light-brown wooden bases of the same form as the skull bases), casts of types, and illustrations, etc.; illustrations of types arranged also in the shape of fans. Here the cases have drawers below, as in the horizontal cases already described. Labels: The general ones black on white and of larger size; special ones in black on green with green borders and black on gray with red borders. Casts of types (Schlagintweit Collection) also in the open, on the wall, in larger groups above the cases (see fig. 113); these types have the form of medallions. Similar typical heads in square frames and on gray backgrounds also in the cases. Some of the skulls are under glass, with light-brown paper strips on the edges.

While in Great Britain and Ireland, as well as in America, the museums keep open later than they ought, the limitations in this regard in the collections of the "Jardin des Plantes" are very marked. Entrance is more or less beset with difficulties, and it is only by exception that one can go about without hindrance. While in the former case they go too far, here, through lack of employees, they do not go far enough.

The annual expenditure of the Jardin des Plantes (museums, zoological and botanical gardens), is $200,000.

41. NOTES ON VARIOUS MUSEUMS AND LIBRARIES IN PARIS.

ETHNOGRAPHIC MUSEUM IN THE TROCADÉRO.

I was compelled to visit this museum twice, since in the absence of the director I could not obtain access to all its departments on the occasion of my first visit. Since 1889, when I saw it, it had not improved in its administration, though it had increased much in its possessions. The Asiatic collections have been removed and are now exhibited only in the Musée Guimet which, since that time, has come into the possession of the Government. The halls of the Trocadéro (formerly the Exposition Palace) are not well adapted for this collection. The cases are of the most primitive kind (mostly old exposition cases), the method of installation is no less so, consisting in part of trophies on the walls; the labeling is incomplete and intended more for the general public. The collection is not much cared for, in short, it has fallen behind the modern museum technic. A lack of sufficient means is the cause for this. How surprising it is that the enlightened French Government is so parsimonious in this respect! Paris, which in many respects surpasses all ought not to retrograde in the matter of ethnography, but now a great effort would be necessary to bring the collection up to modern standards. The small number of officials in charge of this rather extensive collection bears no relation to its present needs; on this account, also, only one of the various halls is opened at a time, and therefore no adequate publication of the valuable materials can be made. The annual expenditure is only $4,500.

GUIMET MUSEUM (PLACE D'JÉNA, 1).

This is now a Government collection. This museum I was also compelled to visit twice for the same reason that I did the Trocadéro. On account of lack of assistants it opens its halls only intermittently, and in the absence of the director admission can not be had to the closed portion. The plan of Mr. Guimet, to establish a museum of comparative religions, has been limited to Asiatic religions and extended, on the other hand, to cover the general ethnography of Asia. In respect to east Asiatic religions, the museum is over rich and suffers from lack of space; in view, however, of the difficulty of extending the already considerable building, it being hemmed in by other structures, a serious problem is presented—certainly an instructive circumstance for the consideration of those contemplating the erection of new museums. Although the building was erected for the purpose, it does not meet the demands of modern museum construction, either in the relative position of the several halls to each other, which are influenced by its triangular ground plan, or in respect to lighting, though, notwithstanding all this, it has many good features. (Photographs were unobtainable.) I must pass over here the history, the contents,

and the valuable publications of this most justly famous museum, as it would lead me too far. Besides, Paris is easily accessible to everyone and a desirable place to visit. I will only remark that the exhibit, so far as the contracted space allows, is very good; the labeling, however, is so deficient as to oblige one to purchase the guides and catalogues. The labeling of the ceramic collection is especially defective, although not in the same degree as in many other museums. Ground floor: Chinese and Japanese ceramics; Siam and Cambodia. Second floor: Indian, Chinese, Japanese religions; Indo-China. Third floor: Japanese paintings; Greek, Roman, and Egyptian antiquities; Korea. The departments relating to Japanese religions and the other Japanese collections impressed me as the most noteworthy and as most thoroughly worked up and labeled. The nephrite collection contains wonderful specimens. At all events the museum is in its field unexcelled, though it is capable of improvement as to technical museum arrangement. The annual expenditure is $9,500, nothing being allowed for purchases; Mr. Guimet has thus far himself provided for these in some cases. The increase in the collections, therefore, depends mostly on donations.

LOUVRE.

I refer only briefly to the Louvre, which I also visited on two occasions. The collections are of exaggerated extent. The installation is in general antiquated and little cared for; the labelling unsatisfactory. I received the impression that an energetic hand could improve the existing conditions. It apparently suffers also from lack of means. While formerly (as late as 1889) umbrellas and canes could be carried among the collections, they must now be checked (without charge). The danger of fire in the Louvre is great. The most beautiful is the new Rubens Gallery, opened in 1900, and excellently lighted, which can not be said of the adjoining Van Dyck hall, also opened in 1900, nor of most of the Louvre halls. The Marine and Ethnographic Museum on the third floor is in the same defective condition that it was when I saw it eleven years ago. It is in some respects very rich in specimens, but it is not scientifically fitted up, and its installation is as unfavorable as can be imagined. The collection of Japanese and Chinese porcelains (collection Grandidier), containing about 4,000 specimens, in a poorly lighted half story, is carelessly installed in cases, and it is entirely undetermined and unlabeled. I saw nothing in the Louvre in the way of museum construction or technique which would be worthy of reproduction in a new building. I do not wish, however, to put myself in the light of one overlooking the importance of the Louvre among the museums of the world.

GALLIÉRA MUSEUM.

The Musée de Galliéra is a sumptuous building in the Italian renaissance style, by Ginain, in the neighborhood of the Musée Guimet,

completed about twenty years ago. It is tasteful and grand alike in its exterior and interior. It contains a municipal art collection. In view of the fact, however, that this is yet too small to fill the large building, it is partly occupied also as show rooms for the sale of art industrial collections. It has magnificent, high, excellently lighted halls, constituting a monumental structure of a taste and solidity seldom encountered among modern buildings outside of Paris. It is very well worth seeing and departs widely from customary museum models. It is fireproof. A large apparatus for heating by hot air is installed in the very spacious, light cellars.

NATIONAL LIBRARY.

The National Library gives evidence of the fact that an old library can also adopt new improvements. About a third of the 2,700,000 volumes[a] is installed according to the stack system in five decks, each 2.5 meters high, with passages which admit the light; though all this is not in so perfect a manner as in the great new American libraries, yet it answers the purposes for which it is intended. The reading room (salle de travail), 43 meters long, 34 wide, and 20 high, by H. Labrouste, with some 340 seats, is more attractive and more artistically arranged than that of the British Museum with its 300 seats. The written catalogues on the crescent-shaped northern end are easily accessible and excellent. The printing of the catalogue (alphabetically by authors) progresses slowly on account of lack of means, the first six volumes of about 1,200 pages (down to Bancroft) having been completed only after four years' labor, according to which it would require sixty years more to finish the work, though it is expected to accomplish it in twenty years, as additional means are hoped for. In so wealthy a country as France it is surprising that so little assistance is given an undertaking of such general utility. In this respect the British Museum is unrivaled. (I tested the manuscript catalogue and found there, among others, more than twenty of my writings, which speaks in my eyes for the great comprehensiveness of the library.) The public reading hall (salle de lecture), on the contrary, is dirty, ugly, and in the highest degree unattractive; it consists of several rooms. A new one, however, is about to be constructed. When all of the additions to the library which are in contemplation are completed it will be magnificent. I could only cursorily examine the other rich and celebrated collections there. Here the installation, partly antiquated, seemed to me to be historically justified and accommodated to the objects themselves. The reading rooms are open from 9 a. m. to 4 or 6 p. m., but not in the evening, differing in this respect from England and America. The annual expenditure is $162,500, of which, however, only $20,000 may be allotted to the purchase of books and $20,000 to the printing

[a] Also 250,000 copper-plate engravings, 150,000 coins and medals.

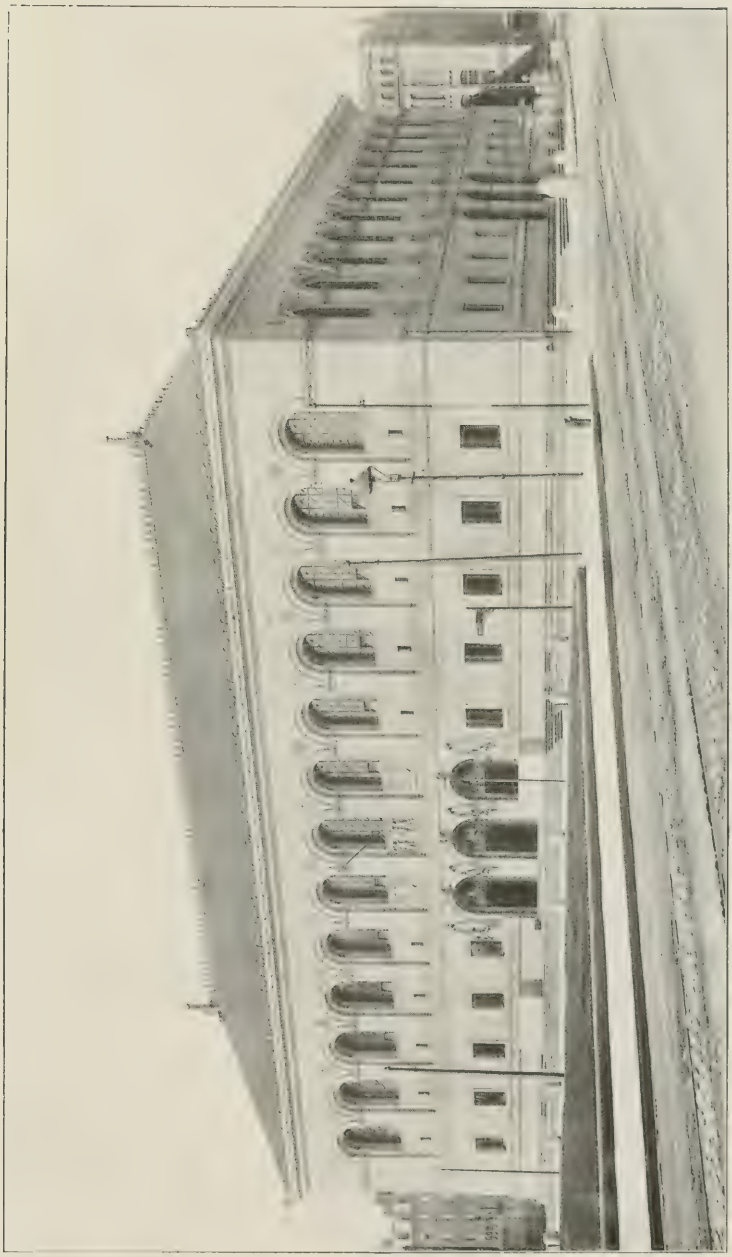
of the catalogue. I call attention, among other things, to the list of foreign periodicals, Liste des Périodiques étrangers (2d. ed., 178 pp., octavo), published in 1896, containing 4,324 numbers.

SAINT GENEVIÈVE LIBRARY.

The Bibliothèque Ste. Geneviève is an original and beautiful building (close by the Pantheon, in the neighborhood of the Sorbonne), constructed in 1843–1850, by H. Labrouste, and also interesting to me because the celebrated Public Library in Boston—which I hope to discuss in detail in a future report—resembles it in its exterior. The Boston building, however, is a square of 75 meters, with a large courtyard inclosed by four stories, while the Ste. Geneviève building is a rectangle 106 meters long, 27 meters wide, with two stories, having only four windows on the narrow side. It seems to me unjust to speak of this as a plagiarism, as has sometimes been done. The Paris Library

FIG. 114.—Library of Saint Geneviève, Paris, France.

cost $325,000, the Boston Library, $2,500,000. I include here for comparison the fronts of the two buildings (fig. 114 and Plate 40). The ground plan of the second floor, a cross section, and a side view of the Ste. Geneviève Library is given in the *Allgemeine Bauzeitung*, 1851 (Plate 386); ground plan of the ground floor in the same journal, 1852 (Plate 471). A photograph of the building was not obtainable in Paris, and I had to have the one which is here published made. On the ground floor, on the right and left of the somewhat dark entrance hall, is installed the collection of books founded in 1626 (250,000 volumes, as given by one of the librarians), according to methods which are not modern, on wooden shelves, the valuable specimens (incunabula, Aldines, etc.) in cabinets. A shallow stair hall, built on the back in the central portion, measures 2.5 by 9 meters. The large, very beautiful and noteworthy reading hall, with accommodations for 476 readers, and a comprehensive reference library, is located



PUBLIC LIBRARY, BOSTON, MASSACHUSETTS.

in the second story, and has a gallery. It takes in the entire length and breadth of the building, is 100 meters long, 21 wide, 14 high, with iron groinings and pillars, and is decorated with objects of art. It is very homelike. It is open from 10 a. m. to 3 p. m., and from 6 to 10 p. m.; lighted in the evenings by gas, electricity being not used on account of greater danger (?). The damaging influence of gas upon the books is overlooked. The total expenses are $23,250, of which $3,000 are for the purchase of books, $16,000 for salaries, and $4,250 for administration. An abbreviated catalogue and a catalogue of the manuscripts (3,500) and first impressions have been published.

I visited also the Pantheon, whose artistic decorations are not effective on account of poor lighting, and the Sorbonne, which in its new portions, decorated entirely in white, is very impressive.

There are certainly still many other things in Paris from which I might have learned something for my special purpose. This would, however, have required a much longer stay than the few days which I had at my disposal for investigating some of the many features in that city of cities.

When one has spent five weeks in large cities of England and is then immediately transported to Paris, he feels as if he had come upon the center of a higher civilization. I had that same impression years ago. This remark relates naturally only to the external appearances of life, not to the intrinsic worth of culture, which are the same in England as elsewhere. But the lower classes in the large cities of the insular Kingdom appear poorer and more degraded, their outer bearing more repulsive, further removed from enlightment and humanity. At all events they enjoy life less. Compare the enjoyment of life of the French in the streets of Paris with that of the English in London, Manchester, Liverpool, Glasgow, etc., and you have a contrast as marked as that between day and night. If modern civilization under the influence of trade and manufactures tends to the result which has obtained in England, it is surely a regrettable departure, which is practically carrying us back to barbarism.[a]

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[a] Dr. T. C. Horsfall, whom I have already mentioned, says on page 3 of a very readable recent paper, The Use of Pictures in Education, Manchester, 1902: "What will become of England if towns like smoky, unhealthy Manchester continue to grow as they are now growing? * * * Our big towns already contain a very large and constantly increasing proportion of the English people, and a great majority of their inhabitants are living under conditions which make physical, moral, and mental health impossible. No one who knows what south and east London, Manchester, and indeed all our large towns are, can resist the conviction that, unless the majority of our people can soon be got out of such places, or unless the state of the towns is soon very greatly improved, England, now preeminently the land of cities, can not long retain her place among great nations. It would be as possible for a great cathedral to escape destruction should walls and columns be rotten, as for a great empire

The marked difference between the external forms of life in England and on the Continent results from the fact that the Island Kingdom has always attended to its own affairs and adhered to its customs and usages, while the rest of the cultivated world has learned to make life more beautiful for itself. This exclusiveness has had as a consequence a remarkable inflexibility in the manner of living, which has been fully realized by enlightened minds there. So Matthew Arnold (died 1888), one of the most esteemed of modern writers, says that the English nation has remained hopelessly in the rear in comparison with the progress of other European peoples, and that what it needs is not personal freedom, not wealth, industry, and the blessing of children, but obedience, culture, and refined enjoyment of life. The Englishman troubles himself even less than a Frenchman concerning what goes on in the rest of the world. Manufacturing and trade interests, and the strife for money, in connection with the provision for so-called domestic "comfort," which, however, in the German sense, is not such, occupy in general the monotonous grind of life from which it is not decorous to depart. Amusements among the higher classes are of a dreary sort, and the external circumstances under which they seek them are often cheerless. As a result of this, the English often enjoy themselves much more on the Continent than they do at home. The Englishman, who when abroad is most exacting, when at home is of a most touching modesty, so that the German in England appears to be exacting.

I submit these few remarks merely for the purpose of explaining why it is that travel for study in the large cities of England is not associated with much pleasure, especially since the enjoyment of the hospitality, although extended in richest measure to strangers, is rather a task, both on account of the great distances in the cities and of the customs of the country, which make ease of intercourse difficult.

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to maintain its power, should most of its people be such as the inhabitants of large parts of London, Birmingham, Glasgow, and Manchester now are. Of the evil conditions affecting the life of the inhabitants of big towns those which receive most attention are drinking, licentiousness, unwholsome dwellings, smoke-laden air. * * *"

And on page 21: "Very little intelligence is needed, for seeing that, if we could raise the life of our towns to even as high a level as that of Geneva or of any German or Dutch town, and escape the shame we now feel at the preventable baseness of English town life, that would be a result which, though it cost him every year half of his income, would make every well-to-do Englishman ten times richer in all that is best worth having than the richest man now is. * * * I greatly fear that England is destined to fall, a land of starved schools, of playgroundless, treeless cities, and of well-supported hospitals, reformatories, and lunatic asylums."

XIV.—BRUSSELS.

42. ROYAL MUSEUM OF NATURAL HISTORY OF BELGIUM.

[Musée Royal d'Histoire Naturelle de Belgique.]

The Royal Museum of Natural History of Belgium, which has become famous as regards its contents and management under E. Dupont, was ten years ago moved from the interior of the city (Place du Musée) and installed in a rebuilt monastery in the suburbs, in a high and somewhat isolated position. This, however, was only done with the intention of erecting a new building close by. This has now been undertaken; the house is under roof and will be ready for opening in a year.[a] It is immediately adjacent to the present museum, and the buildings will communicate with each other. It is intended for the

FIG. 115.—Royal Museum of Natural History, Brussels, Belgium. One of the long sides of the building.

prehistorical, paleontological, zoological, mineralogical, geological, and botanical collections of Belgium. I regard this new building as a model of its kind, and while it should not be imitated without modification, since from the start it has been specially adapted to the collections to be exhibited, yet anyone can with profit adopt some of its features in constructing a new museum building. Fig. 115 represents a long side of the half-completed structure, which adjoins the old building at right angles. It is on rising ground. Fig. 116 represents the narrow end, with the main entrance and stairway, as well as a perspective view of the other long side, likewise in a half-completed condition, and fig. 117 the main hall of the ground floor, half finished. The ascending floor has different elevations connected by steps. In

[a] Will take some years longer to complete it—1903.

the center stands the framework of a new case (certainly capable of improvement). The left half of the hall corresponds with the long side shown in fig. 116. The orientation of the building appears to be not without advantage, but I am not fully informed on this point. The style is simple and attractive. The exterior is of stone. The slope of the ground is indicated by three unobtrusive divisions of the façade into different levels (fig. 115). It is entirely fireproof in construction—of iron, brick, and cement. The interior decoration will be quite simple and of uniform color. The building is conspicuous from the very limited wall sufaces, consisting, as it does, almost entirely of broad windows with but little space between (fig. 115). The entire ground floor constitutes one large undivided hall (fig. 117), with windows on both sides, and,

FIG. 116.—Royal Museum of Natural History, Brussels, Belgium. Narrow side of building, with entrance.

as it was feared that it would not be possible to provide sufficient light from the sides on the right and left, one longitudinal half of the hall is, in addition, supplied with skylights, there being no stories above. This large hall has double windows, contrary to the custom in most museums, as it was thought that otherwise the room could not be sufficiently heated on account of its great amount of window surface. I think this fear is without foundation; but if the cost is to be disregarded it is manifestly better so at all events, for the purpose of keeping out the dust, in case the new method of ventilation is not adopted. (See Manchester, Glasgow, and Liverpool above.) This is not contemplated, as the system was unknown here, and the steam heating apparatus is already installed. The second and third floors cover only one longitudinal half of the building (fig. 115). The third story

is devoted to the collections; the second - practically only an intermediate story—is allotted to many workrooms, which all adjoin one another. Such an excellent arrangement is seldom found in any other large museum.

In the basement, separated by a corridor 6 meters wide, are located the preparators' quarters and storerooms, the first well lighted, the second not so well, but to be provided with electric lights. The whole length is 84.26 meters, the width 30 meters. There is one preparators' room 24.8 meters long and 15 meters wide, and three, each 18.6 meters long and 15 meters wide. Corresponding to these are four storerooms, each 7 meters wide. The height of the basement rooms is 4.5 meters; the portion under the gallery of the ground-floor hall, 5 and 7 meters.

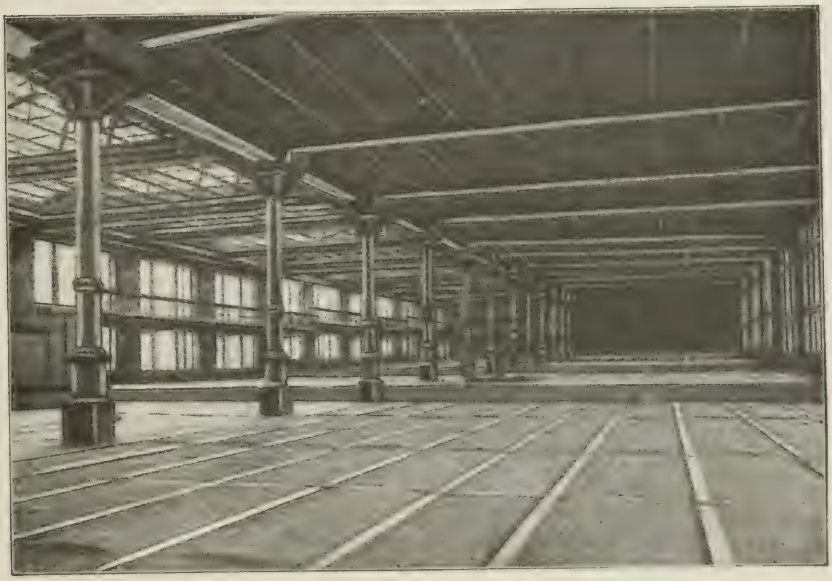

FIG. 117.—Royal Museum of Natural History, Brussels, Belgium. Large lower hall.

The large hall on the ground floor (to be devoted to the recent and fossil vertebrate animals of Belgium and its colonies) is 84.26 meters long, 30 meters wide, and 7.2 meters high. It will, however, be lengthened by 18 meters, so that the entire length of the building with the stairway hall in front will be 109 meters. The ceiling of this hall, in its entire width of 30 meters, is supported only by a central row of iron columns, of which there are 13, spaced 6.2 meters apart. Each half of the hall has, consequently, a clear, unobstructed width of 15 meters for the use of the collections a width which, without columns, has been made use of in but few museums before the present day. Even permitting, as is proved in this instance, a superstructure of stories,[a]

[a] The breadth of the hall in the Paris Anatomical Museum is 14 meters, without supporting columns.

museum halls of such a width ought not to be obstructed by columns, as is universally the case. On the window side of the half with a double-glass roof there is a gallery 3.25 meters broad (in its first section still broader), intended for the cave finds, as well as for the living and fossil fishes of Belgium and its colonies. A similar gallery runs along the rear narrow side of the hall. The four sections of the floor and ceiling, which are of different elevations, are 24.8, 18.6, 18.6, and 21.8 meters long. In the second (intermediate) story are located for a length of 91.3 meters and a width of 15 meters, besides a stairway, hall, and two office rooms, 11 workrooms adjoining one another, each 9.8 meters long, 6.2 meters wide, and 4.75 meters high. At the rear end there are three library rooms of the same dimensions. In front of these rooms there is a corridor 3 meters wide and 3 meters high, from which anterooms (without windows) 2.2 meters wide and 3 meters high lead into the workrooms. In the third story, again, there is an exhibition hall 84.26 meters long and 15 meters wide, for the recent and fossil invertebrate animals, the fossil floras, the minerals, and precious stones of Belgium and its colonies. It has five different elevations, rising like steps, and on each level horizontal cases underneath are intended. Therefore there are about 400 running meters of horizontal cases in five series, rising one above the other, with longitudinal passages and crossways between, the latter with stairs. The ascending of this hall afforded sufficient extra space in the second (intermediate) story for workrooms. Its lighting is excellent; the long side at the foot of the step-like installation of horizontal cases is one combined glass window (glass partition wall). In addition, a row of upper windows on the opposite half of the roof throws light directly on these horizontal cases. The height of this hall varies between 2 and 7 meters, being 2 meters at the top and 7 meters at the foot of the step-like construction.

A better utilization of the space is hardly imaginable, and what should be particularly noticed is the fact that no superfluous space (nor likewise money) is expended on the stair hall, as is the case in most museums. This stair hall is built in front and not inside of the building, and is only 17 meters long and 7.1 meters deep. Each story is directly connected with the old museum.

I do not go into further detail on account of the unfinished condition of the building, but I would advise every architect who has a museum to design to scrutinize closely that of Brussels. It is a departure from every other structure of its kind because it is adapted to the original exhibition plan of the director. Mr. E. Dupont has throughout his entire life had in view the establishment of a Belgian national museum based on the researches that have been made in that country, so taking the national collections as a nucleus for this, he shaped his plans accordingly, the collections from other parts of

the world being utilized only so far as they are necessary to a proper understanding of this nucleus. With this in mind he has comprehensively arranged the researches according to a definite plan, and has recently included the Kongo State as Belgian. He regards the working up of the collections as a less important function of a museum than the procurement of the materials, in which latter respect he has been very successful, as is evidenced by the famous Iguanodons 8 meters high, 10 meters long, the fossil crocodiles, tortoises, sharks, whales, elephants, giant deer, rhinoceroses, etc. All of these, in addition to the extensive cave finds, will be installed in an intelligent way in the basement hall. In the rear portion of the hall of 84 meters length a herd of Iguanodons will be installed in many different positions, for which purpose the model is already prepared. As a parallel representation of animals now living, there will be shown a herd of elephants from the Kongo. The different elevations in the hall, rising by steps, will be utilized for separating the different epochs of the earth's history and the general view of the installation in this immense space promises to be most magnificent, provided it is not detracted from by the cases.

In view of the fact that the staff of seven museum experts must divide its time between exploring tours and the conduct of the museum, the assistance of outside experts, who are paid $5 a day and traveling expenses, is obtained to identify and work up the collections. For this same purpose many specimens are sent out of the museum to receive attention. Scarcely any other natural history museum in the world is so uniformly planned and managed, but Mr. Dupont has been successful only after withstanding the greatest opposition and battling for decades. He insisted so firmly upon his well-considered plans that at one time for a year and a half his authority as director of the museum was suspended because he would not submit to the regulations promulgated by the minister. Finally, however, he carried his point. He also had a desperate struggle to reserve to himself the choice of the architect, who has constructed the museum entirely in accordance with his own personal directions. The cost of the building has been estimated at $215,000, the cases, etc., $40,000 remarkably small sums compared with the cost of construction of other museums.

The rooms of the old museum will later be used for the non-Belgian portions of the collections, but since they are manifestly not suited for museum purposes, the erection of a second new building is even now contemplated, for which purpose which is of the greatest importance in the development of every museum—an abundance of space is available on the museum grounds. Little, however, can be said in praise of the present museum. The reconstruction of the monastery could have been better arranged so far as regards the lighting. The cases are those of the old museum, not answering modern requirements. The

installation is as a whole not attractive, but in many details worth imitating. The charts of geographical distribution, now found in many museums in the world, emanated from Brussels and have been elaborated here more than anywhere else. Especially noteworthy is the labeling and a large series of long descriptive and instructive placards. The minister at one time instructed the director to arrange for lectures in the museum for the benefit of the visiting public; the latter determined, however, to give these in the form of information on labels, arguing that in this way the information could be disseminated much more widely.

In this retired location the museum is visited annually by 80,000 persons; in the city formerly by 150,000. It is opened daily from 10 a. m. to 3 or 4 p. m., according to the time of the year—in my judgment, much too long a time for preserving the colors of the specimens.

For the prevention of fire, extinguishers are everywhere installed, known as the Extincteur Instantané, Système Ad. Vandrooghenbroeck, Molenbeek-Bruxelles.

The annual expenditures amount to $31,750. Publications are issued as follows: Annales (10 volumes in folio up to 1896), Bulletins (7 volumes in octavo up to 1888), and Mémoires (since 1900 one volume in quarto).

It is not easy in a brief space to do justice to this original and uniquely organized museum.

43. BRIEF NOTES ON VARIOUS COLLECTIONS AND BUILDINGS.

I also visited in Brussels the House of the People (Maison du Peuple), designed by Horta, a remarkable, large, modern structure (completed in 1899) for the recreation and instruction of the working people, erected by themselves at a cost of $160,000 and utilized also as a socialistic sales house. It is entirely modern in style, fireproof, and especially noteworthy on account of the interior iron construction of a hall, which accommodates 3,000 persons, used for assemblies, lectures, as a theater, and for concerts. It is artistically embellished, not in the style of a railway station, as is found in many museums—as, for instance, in the older part of the Metropolitan Museum of Art in New York, in the museums of Science and Art in Dublin and Edinburgh, and in the Natural History Museum of London, etc. Architects who build museums should inspect this hall.

The Royal Museum of Modern Painting (Musée Royal de Peinture moderne) is open daily from 10 a. m. to 3, 4, or 5 p. m., according to the time of the year. Its lighting is insufficient, as in many picture galleries. The great number of watchmen who were sleeping or entertaining themselves was noticeable, as also the marked lack of visitors.

The great Royal Museum of Ancient Paintings and of Sculpture (Musée Royal de Peinture ancienne et de Sculpture) made an excellent impression on me, with the exception that the halls are not well cared for.

I did not at this time examine any other institutions in Brussels, partly because they were already well known to me and partly because they were said not to be very important, as in the case of the Congo Museum in the somewhat distant Tervueren.

XV.—HANOVER.

44. PROVINCIAL MUSEUM.

The Provincial Museum is a new, rather large, and isolated museum, near a park, for which a public competition had taken place in 1896. It was not quite completed in October, 1901, but opened in February, 1902. It was constructed between 1897 and 1902 by H. Stier, in a modified, Italian high renaissance style, at a cost of more than $500,000. The city contributed the site and $137,500. It forms a rectangle 82 meters long and 61 meters wide, with its main front facing the southwest, the most favorable orientation for a building practically square; otherwise it is better to have the narrow sides face the south and the north. For this purpose the triangular site which was available, the main front being placed along its hypothenuse, would have been utilized to the best advantage if the right perpendicular (Plank street) had been taken as the principal axis. In this case, then, the form of the building would not have been shaped after general architectural principles, but only with regard to the collections to be housed. The three-storied building incloses a courtyard measuring 48 by 28 meters. The average width of the wings is 16 meters; the ground-floor story is 3.6 meters high; the second story 5.9, and the third story 6.5. On the ground floor and the second story there is throughout light from both sides (see ground plan of the latter floor in fig. 143); in the third story there are 11 rooms with light from one side and 11 rooms with skylight. The total height from the street level to the cornices, 16.2 meters; the four pavilions on the corners extending 4.45 meters above this, and the rotunda still 28.8 higher. The entrance hall on the ground floor is 9.5 high and 16 meters square with a branching stairway to the second story, where again there is a large hall (with cupola) 16 meters square—the main hall of the museum.

The building is of fireproof construction throughout, except the cupola, which is of wood (for economy's sake). The roofs, however, are covered with copper sheets with iron bands and purlins. The exterior walls are of sandstone and tufa, with granite water tables; the carved ornamentation of the main front is of limestone; the sides facing the courtyard are cemented and painted with amphiboline color, and the

cornice and window sills are of sandstone. For the interior cast-iron columns and beams are employed, covered throughout with terra cotta and siliceous marl. The floor is made of xylopal (sawdust with white cement), supplied by Kühl & Miethe, in Hamburg, which is applied moist upon the surface of a concrete foundation; it has a yellow tint and is elastic. In both halls and in some of the other rooms terrazzo combined with linoleum is employed. As shown in fig. 120, which represents a room in the second story, the interior decoration is simple except for the capitals, etc., which are more richly ornamented; ceilings and walls painted with light lime color. There is steam heating and no ventilating apparatus.

The building cost $6.50 for each cubic meter of built space; the foundation, $54,500, or $13.50 for each square meter, there being approximately 3,900 square meters. The new fixtures cost $14,000.

FIG. 118.—Provincial Museum, Hanover, Germany.

I take these details from the readable and comprehensive description by the architect in the *Zeitschrift für Architektur und Ingenieurwesen*, 1902, Part I, 18 half pages, with four plates and five text figures, quarto.

For a provincial museum this is a most noticeable work and much may be learned from it. The building had to serve for collections of all kinds, for art and science, ecclesiastical antiquities, mediæval art objects, sculptures, paintings, coins, ethnography, archeology, zoology, paleontology, botany, mineralogy, etc., and contains also as a conspicuous exhibit the so-called "Guelph" museum, which is held in trust by the joint house of Brunswick-Lüneburg. It was necessary in designing the building to make it meet the most varied needs, and on that account the architect imitated famous models, avoiding, however, above all things, insufficient lighting, which is so often found. All

the rooms are light except the basement, which was properly not intended for collections, but which, on account of the necessity for abridging the original plans, for reasons of economy, had to be devoted to this purpose. Thus the ethnographic and prehistoric collection there exhibited is quite inadequately lighted. Only on the southeast and southwest sides may disadvantages arise from too much sun. The partition of the third story into 22 small rooms is not altogether advantageous, the natural sciences being crowded thereby. In addition, in this department, for economical reasons, old cases were used as well as new ones made after an entirely antiquated pattern, although good examples were at hand nearby in the collections of the veterinary

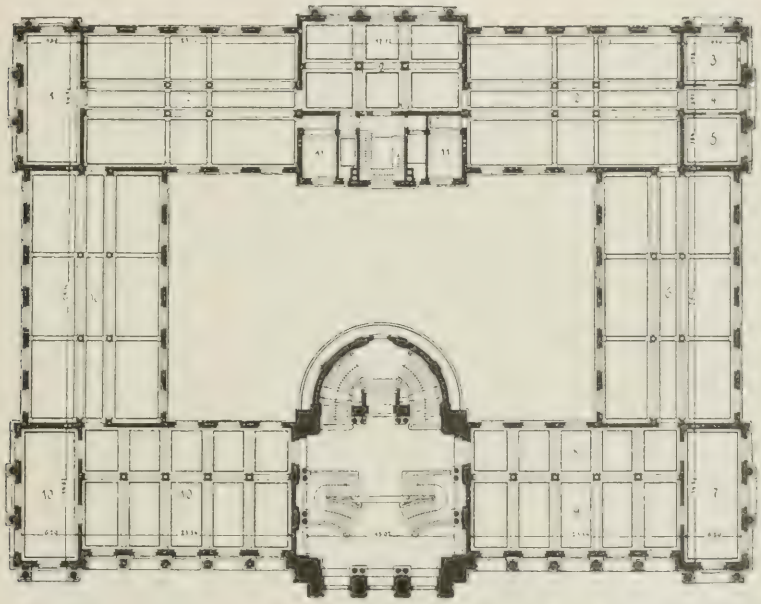

FIG. 119.—Provincial Museum, Hanover, Germany. Plan of second story: 1, coins and seals; 2, historic antiquities; 3, director; 4, anteroom; 5, library; 6, paleontology; 7, herbarium; 8, petrography; 9, mineralogy; 10, sculpture; 11, workroom.

high school. The columns and beams of the second story are not adapted to the dimensions of the rooms and look heavy. Whether the columns could not have been omitted altogether in rooms of this limited width is a question well worthy of consideration. In the Brussels Museum we learned of a hall 30 meters wide with only one row of columns in the center (see above), a span, therefore, of 15 meters, while the rooms of this provincial museum are only 14 to 15 meters wide.[a]

As fig. 118 shows, much money has been spent in the artistic exterior decoration of the building, and not less for its two large halls,

[a] The ground-floor hall in the Galeries d'Anatomie in the Botanical Gardens in Paris also has a width of span of 14 meters without columns.

on which account it was necessary to make the building smaller than was originally planned and demanded by the extent of the collections, therefore it became impossible to install the natural science collections according to modern requirements. Besides, the form of the entire structure admits of no extension. Though the building is only just completed, the builder already calls attention, in his description, to the fact that the natural-history collections must have a separate building! No provision has been made for the introduction of dust-free air into the museum, therefore the most recent important improvements in this direction have not been considered. As the museum, when I inspected it, was not entirely completed, I am not in

FIG. 120.—Provincial Museum, Hanover, Germany. A room on the second story.

a position to express a final opinion regarding it, though I believe that here, in conjunction with some undesirable features, much that is good is to be found.

45. VETERINARY HIGH SCHOOL: TECHNICAL HIGH SCHOOL.

The Veterinary High School (Tierärztliche Hochschule) is a large, only recently completed building in a group of single houses. The annual expenditures are $32,500. There are about 300 students and 17 teachers. I confined my attention to the anatomical institute, where there is a museum which is good but offers nothing extraordinary, as there was only a limited sum available for the building and as there

likewise is for its maintenance. In the large, light, clean dissecting hall is such an effective ventilating apparatus that when it is set in operation, as required, it obviates all odors. The iron cases containing the collection, located in well-lighted halls, are of the Dresden pattern, although not of the most improved type.

The Technical High School (annual expenditure $125,000), whose mineralogical collection I visited, possessed nothing worthy of mention from a technical-museum standpoint.

CONCLUSION.

In reviewing all these experiences of travel—to make clear what there was new to learn, independent of old and well-known matters, especially in connection with the building of a new museum in Dresden—I note particularly two things that deserve especial mention:

(1) The new ventilating and heating methods employed in the museums of Liverpool and Glasgow, originating contemporaneously though independently of each other, and also installed in the technical schools in Manchester and Liverpool, as well as in the Rylands Library in Manchester, elsewhere in use only in America—has hitherto been entirely disregarded in Germany, so far as I know; and

(2) The plan of construction of the new Brussels Natural History Museum, which, being accurately adapted to certain special purposes, ought not to be copied without modifications, is very instructive and worthy of imitation as respects its lighting and utilization of space, and also as regards its low cost, which has not, however, been allowed to detract from its pleasing effect. It, therefore, appears to be most noteworthy.

In general, notwithstanding the shortcomings that attach to most human things, the Natural History Museum and the Museum of the Royal College of Surgeons in London remain in many respects at the head as models in the line of technic of natural science museums and in the scientific usefulness of the collections. There is probably no museum official who has not learned more in those museums than everywhere else. The method of installation in the Ethnographic Museum in Oxford is unique in its way, and in a high degree suggestive and instructive. The Rylands Library, in Manchester, remains, notwithstanding its many shortcomings as a library building, a magnificent jewel box. Finally, the Galeries d'Anatomie in the Jardin des Plantes in Paris is a most remarkable production, not only as a museum structure, but also as an example of the art of exhibition, particularly the ground floor, on account of its excellent lighting and the simplicity of its plan.

Although I particularize in these several respects in concluding this paper, I do not wish to cast in the background the many other good things that I have already mentioned in their place and for which I

refer the kind reader to the several chapters. On the other hand, notwithstanding all the good that I saw, the opinion forces itself upon me—and I do not wish to conceal it—that, taken as a whole, the art of constructing natural science museums is still in its infancy. In most cases such museums are defectively planned, and it is only exceptionally that we meet with beginnings that may be considered as the dawn of a new era in this field of human endeavor. Then, too, the art of the interior installation of such museums is, in general, still in a very bad state. The principal reasons for this appear to me to be that, on the one hand, whatever is displayed in a prominent locality is imitated without judgment and without wishing at all to better it, and on the other hand, attempts are made quite independently, without any effort to profit by the experience of others in such matters. In most cases, also, plans for natural science museums are carried out too rapidly. A new building is determined upon, money is available for its construction, and then sufficient time is not devoted to properly preparing the plans in advance—presently a plan is selected and all of its shortcomings must be taken with it. With regard to the interior furnishing, however, the conditions are still worse. Usually the building has cost more money than was anticipated and economy must then be exercised in the interior furnishing. Although this is no less essential, yet much too little importance is attached nearly everywhere to the interior installations, and far too slight deliberation is bestowed upon them.

I am convinced that the natural science museum of the distant future will be very different from that of the present, often very inadequate, attempts. On the other hand, art museums have already advanced to a much higher stage of progress, due perhaps to the fact that their contents are not so varied and that consequently the problems to be solved do not present such difficulties.

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